The IRON AGE

May 14, 1959 A Chilton Publication The National Metalworking Weekly

5 Articles on Design

Design Show Program—P. 180

Product Designers Sundberg and Ferar:

How to Adapt New Designs to Automation . P. 143

Are Industrial Unions On the Way Out? – P. 105

Materials Handling: Frontier of Cost Control – P. 188

Digest of the Week – P. 2-3

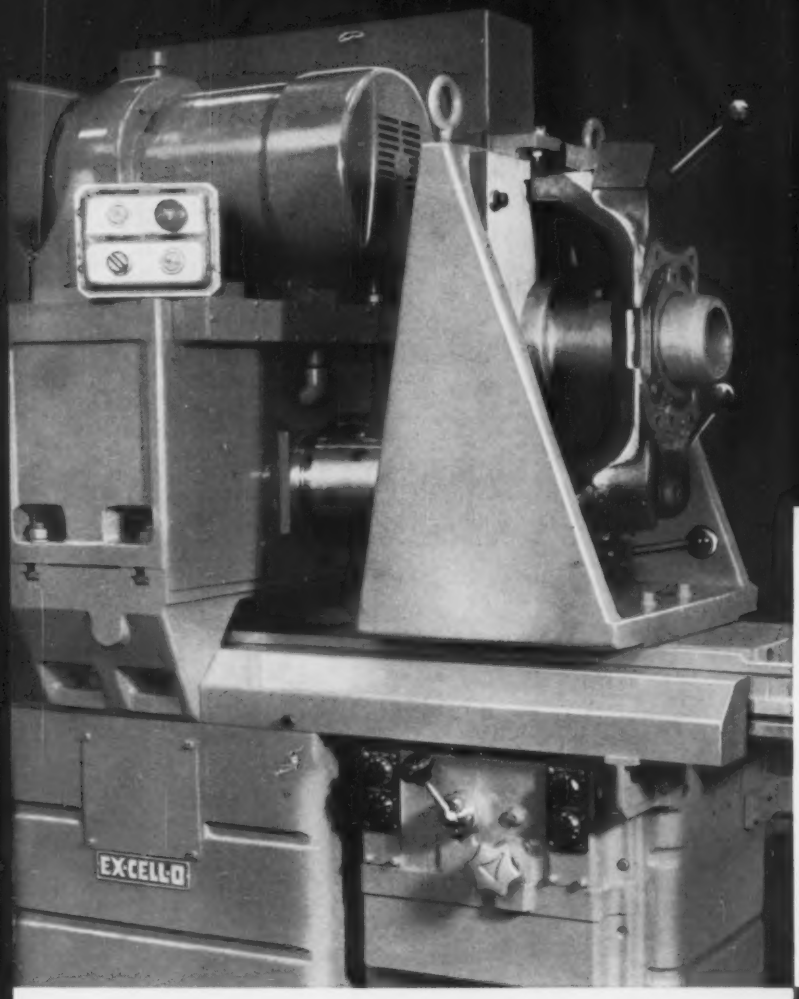
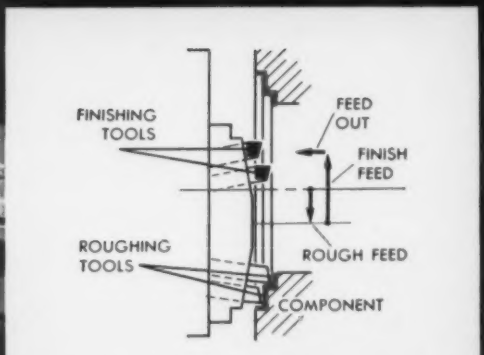


Table pad of the compact Style 2112-B provides ample space for this rugged fixture. Work is shown clamped in position.

RUGGED
PRECISE
ECONOMICAL



Machining cycle and tooling are outlined above, with roughing tools shown fed to depth; finishing is done at opposite end of the feed stroke.

Starter motor mounting at this cast iron clutch housing is faced and bored from rough to finish in one cycle.

59-18

Ex-Cell-O Style 2112-B bores, faces heavy casting in a single cycle

RUGGED for roughing—PRECISE for finishing—ECONOMICAL for short runs

Precision built for boring, turning and facing small or medium-size parts, the Ex-Cell-O Style 2112-B Precision Boring Machine is equally adept at tackling a heavy cast iron truck clutch housing.

The job is done quickly and accurately in one cycle. After clamping, rapid traverse brings the work into position for roughing tools to face two shoulders and plunge two bores. Feed is reversed for finish facing, and table feed-out doubles as a finish-bore pass. A standard hydraulically-operated Ex-Cell-O Facing Head carries the tooling.

Find out how the Style 2112-B or the double-bridge Style 1212-B can put similar flexibility into your operation. Write direct, or ask your local Ex-Cell-O Representative about combining these rugged, time-tested Precision Boring Machines with low-cost tooling for real economy in long runs or limited production.

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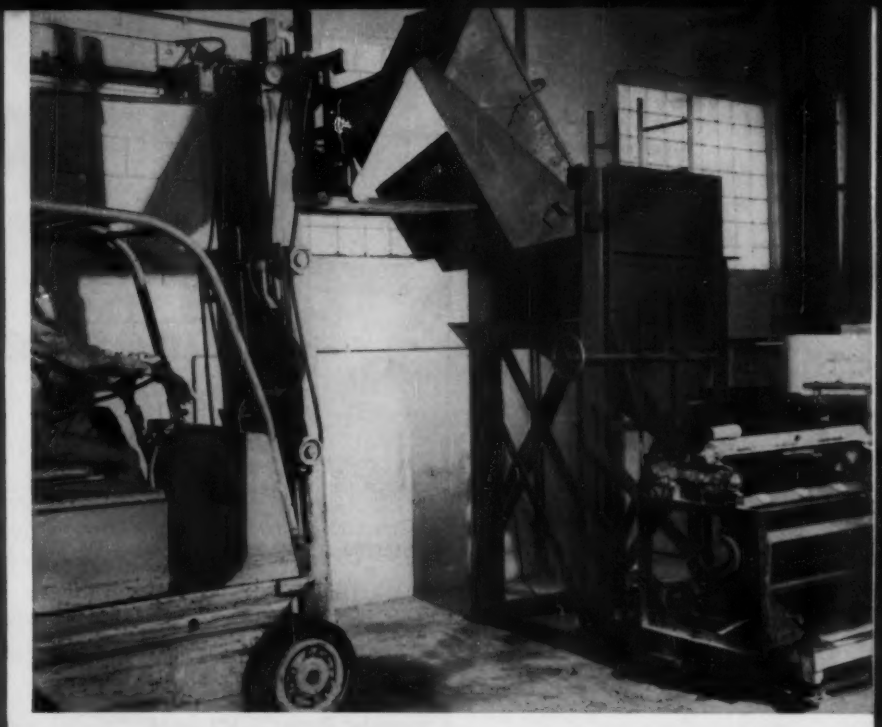
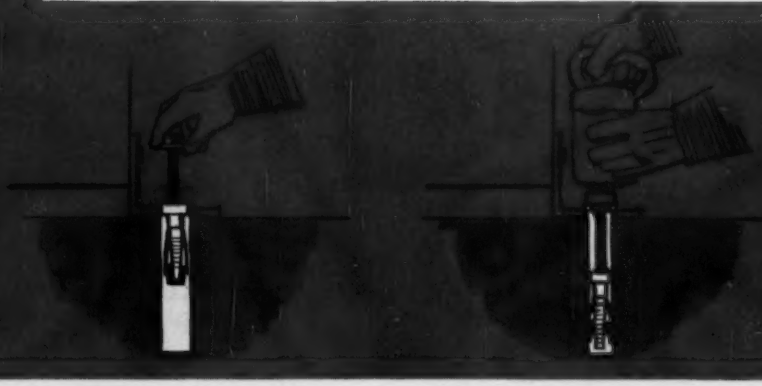
Machinery Division

EX-CELL-O PRECISION PRODUCTS INCLUDE: MACHINE TOOLS • GRINDING AND BORING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • TORQUE ACTUATORS • THREAD AND GROOVE GAGES • GRANITE SURFACE PLATES • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT.

Shown above is a Bethlehem Square Head Anchor Bolt with malleable-iron shell, forged-steel plug, and hardened washer.





Determine position of machine; mark holes on floor; drill holes in machine legs to required diameter; drill holes in floor to required diameter and depth.

Move machine into position; insert assembly through hole in machine leg into the hole drilled in the concrete floor.

Tighten bolt head with power wrench. This draws up the plug, expanding the serrated leaves of the shell. Machine is locked tightly to the concrete base.

Special bolts that anchor machinery

When the forklift truck dumps its load, that hopper bin really vibrates. Keeping it anchored firmly in place used to be quite a problem.

Then Bethlehem fasteners engineers were called in: They recommended using a special-headed anchor bolt with an expansion shell to anchor the hoppers. As shown in the drawings above, this bolt *locks* machinery to base concrete. Today, these hopper bins are firmly anchored, undisturbed by the drastic vibration.

Our fasteners engineers are often able to find a solution that adds up to a saving for the user. If you'd like their help, just get in touch with our nearest sales office.

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The IRON AGE

May 14, 1959—Vol. 183, No. 20

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An Economic Weapon? — Some people would turn the U. S. barter program into a big gun against Soviet economic aggression. But Agricultural Dept. is not for it. P. 112

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DEFENSE CONTRACTING

Advice for Small Firms—There are now more qualified bidders on defense contracts within the San Francisco Ordnance District. One reason is the success of Ordnance's

Metalworking

DESIGN FOR AUTOMATION: Checking over design of new product are Montgomery Ferar, left, and Carl Sundberg of Sundberg-Ferar, Inc. Design Show feature covers the problems automation poses for product designers. P. 143

small business specialist service to potential suppliers. P. 127

TOOL INSERTS

Don't Baby Them—Direct labor and machine costs are cited as more important than tool costs. Some advice: Don't baby your inserts. Concentrate on output. P. 129

DESIGN FEATURES

AUTOMATION CHALLENGE

To Product Designers — Automation brings with it new problems. It's a matter of confining design changes within the limits allowed by automated lines. With proper planning, standard sizes can adapt to a wide range of models of a product. New materials also boost flexibility. P. 143

HIGH-IMPACT PLASTICS

Solve Design Problems—Thermosetting plastics are being accepted as standards in their own right rather than as substitutes for metals. A few basic techniques help make the most of the material in both laminated or macerated forms. P. 146

BETTER PRODUCT DESIGN

With Modern Materials—Proper use of newer materials can be rewarding. One company tries many materials and surfaces in redesign of cooling tower. It took several failures before coming up with the best design. P. 149

TEST DESIGN THEORIES

With Model Kits—The model-building kit is an engineering tool which can prove the worth of any design concept. One company recently demonstrated a complete tracer control system for a welding machine. P. 153

GRAPHIC AIDS

Speed Planning — Success of a new idea can depend on making it clearly understood by all concerned. Graphic illustrations can put concepts across even to those rusty at reading blueprints. P. 156

[illegible] PRICES

SERVICE CENTER PRICING

Revised System — Pittsburgh warehouses are revising their methods to tie sales prices more closely to costs. Buyers can benefit from new system by skillfully combining purchases. P. 109

FERROUS FOUNDRIES

On a Spending Spree — Their business is booming much more than expected, so founders are swamping equipment makers with orders. And things may get even better. P. 110

AUTO BUYERS

Maturing — Market researchers in Detroit expect more car buyers will be asking "What can it do?" instead of "How does it look?" Tomorrow's automobile must meet the needs of the individual. P. 121

DESPERATE STEEL USERS

They're Turning to Conversion—Some steel users are trying to make costly conversion deals to supplement their steel stocks. Slowdowns complicate problems. P. 187

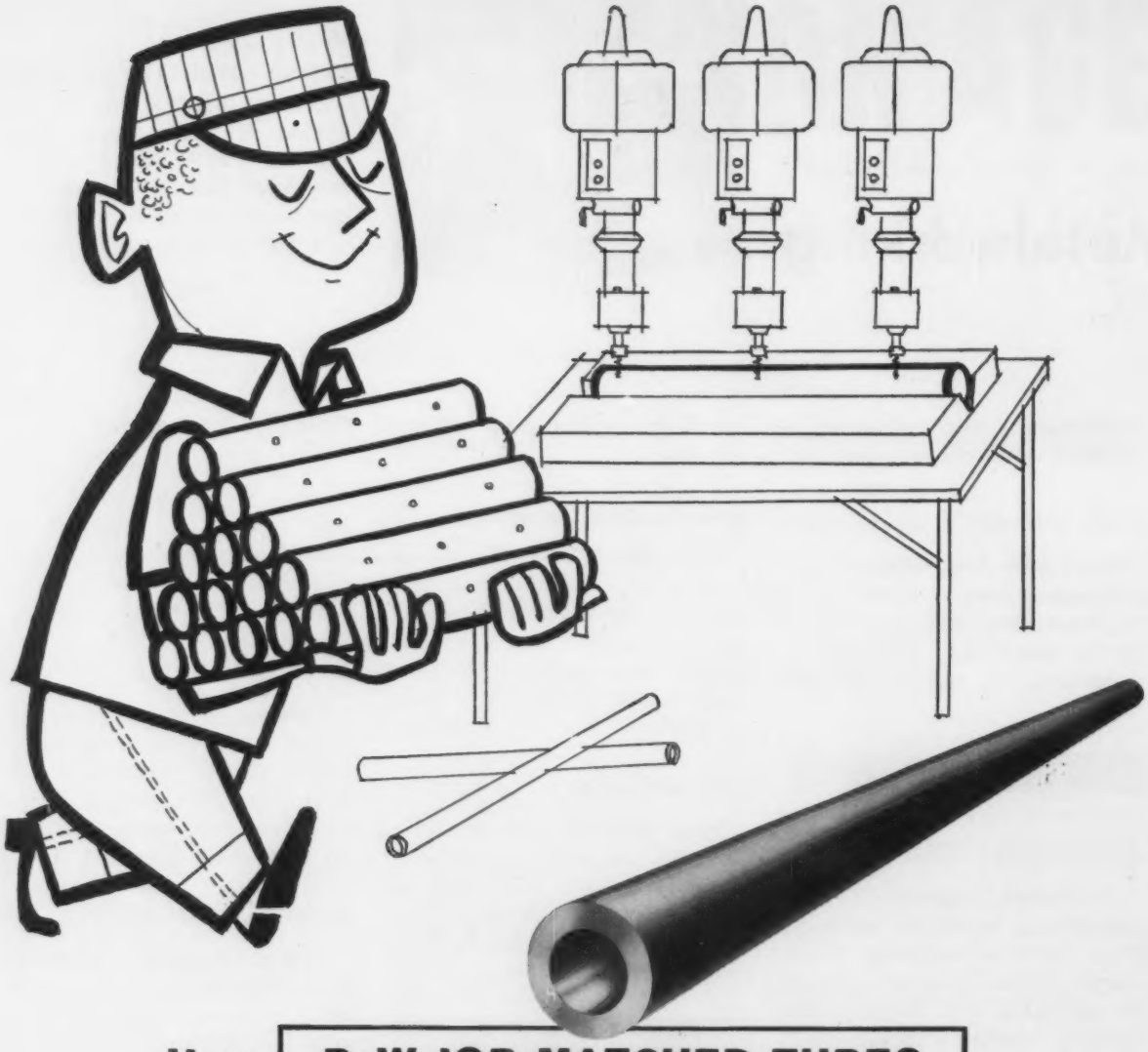
INTEGRATED HANDLING

Cuts Costs—Industry is moving toward completely integrated handling systems with continuous flow from receiving dock to shipping platform. P. 188

NEXT WEEK

DEFENSE BUSINESS

Changing Concepts — Probably no element of business is changing as rapidly as defense. Next week's special report tells how leading contractors are gearing their defense operations to meet these changes as they come up.



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B.F.Goodrich

Hose outlasted pipe 7½ years

B.F.Goodrich improvements in rubber brought extra savings

THE tubes going down that wall aren't metal pipes but hose. A mixture of fly ash and acid water with sharp slivers of metal in it had been eating holes in pipe within six months. Each pipe replacement cost $700 plus about 100 hours of workers' time.

Then B.F.Goodrich hose was put on the job, had been there 8 years when the picture was taken. This is a kind of hose with a lining so tough it has been used in some places to handle broken glass and granite chips.

Smart plant engineers and purchasing men, working with a B.F.Goodrich distributor, had decided to try this special hose instead of pipe. By lasting 7½ years longer than pipe, they now figure that the B.F.Goodrich hose had saved $6400 in replacement costs and $4800 worth of maintenance time.

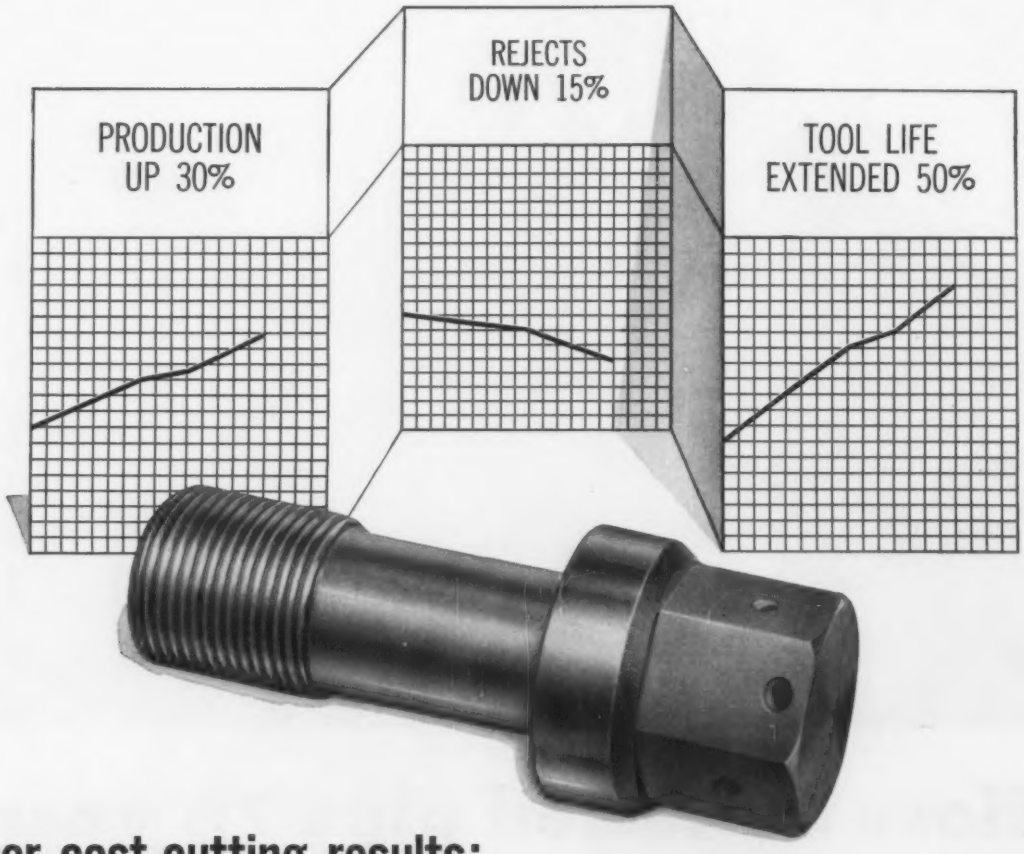
The hose is at a steel company's power plant. It gulps thousands of gallons of water and grit every day but shows no sign of wear, looks good for many years more.

Your B.F.Goodrich distributor has exact specifications for the B.F.Goodrich hose described here. And, as a factory-trained specialist in rubber products, he can answer your questions about *all* the rubber products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Company, Dept. M-569, Akron 18, Ohio.*

B.F.Goodrich *industrial rubber products*

Value analysis boosts production 30%

This was the outstanding result when a metalworking company studied and evaluated production of piston pin bolt heads with a Ryerson representative. The Ryerson specialist recommended Rycut® 40—the world's fastest machining alloy steel in its carbon range.



Other cost-cutting results:

In addition to boosting production, this risk-proof Ryerson alloy reduced rejects 15% . . . increased tool life 50% . . . and gave parts a better finish. Ryerson value analysis of materials and methods may help solve some tough problems for you. Contact your nearby Ryerson plant for details.

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The Die Is Cast

The Pressure Stays On!

Mr. Eisenhower will not let up with his pressure on steel labor and management. If anything, he will—by statements to the press—put both sides farther behind the eight ball than they have been in recent years.

There won't be much collective bargaining in the steel industry this year. It will be "public" bargaining with the Administration committed to stop inflation in a basic industry. Just why Mr. Eisenhower's advisers had him pick the steel industry is beside the point. He did, and that's that for the time being.

Of the two antagonists, steel labor will have to back down the most. If it backs down enough to meet the steel industry's objection to a wage and fringe boost, it will mean a complete change in steel labor strategy. If the steel firms ever agree to a raise which requires a price increase later, they will live to regret it—even though it is proper and good business to pass on part of higher wage costs.

The President's remarks last week widened the already big gap between what steel labor wants and what steel management will give. The labor-management "operettas" in New York last week were pure window dressing. Under present Washington pressure they were a waste of time.

Mr. Eisenhower's remarks were paradoxical. While he abhors governmental interference, he was interfering more strongly than any other president has done BEFORE collective bargaining got started. For that reason Dave McDonald's labor group and Conrad Cooper's steel management group are up a tree. How they will get down is anyone's guess.

Collective bargaining has now been replaced by public bargaining. The White House is a firm member at the table, but it has no responsibility for running the steel firms—or the steel union.

Sooner or later steel companies may have to take out, dust off, and look at the Ben Fairless proposal of 1948. As U. S. Steel board chairman, he then suggested "no wage increase and a steel price cut." He did it. But an auto firm pulled the rug out from under him and the spiral was on again. Maybe the timing was wrong—then.

Ike wants to stop inflation at the steel industry level and he apparently couldn't care less how he achieves it.

Tom Campbell

Editor-in-Chief

That's exactly what Inland's technical chefs will do when its giant, new sintering plant is completed in June. A single day's mix—4300 tons of iron ore particles, 500 tons of crushed limestone, 250 tons of fine coke—will bake a cake of clinkers which can be fed directly into blast furnaces. Result—better, faster reduction of raw iron ore to pig iron, blast furnace production upped 10%—*more and more Inland steel to feed the hungry production lines of fast-expanding Mid-America manufacturing!*

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Surface by Arc-Melting

Jet engine builders are using arc-melted molybdenum and tungsten at a searing 6500°-7500°F to coat nozzles of rockets. The new method consists of feeding wire into an arc orifice where it's melted down. A small jet of argon gas blows the hot metal droplets onto the material where it spatters and sticks. Distance to surface determines both deposition temperature and size of globules.

Tape-Controlled Inventory

On the drafting boards is a complete push-button inventory control system. Not only will the tabulating be entirely electronic, but physical removal and deposit of goods in the inventory racks and bins will be done by tape-controlled machines.

Tools-for-Schools Program

Designed to utilize surplus machine tools for educational purposes, the "Tools for Schools" program has shown a large increase in allocations: a total of 7500 machine tools in 1958 compared to 1700 in 1957. The government has also transferred over 20,000 buildings to school districts throughout the nation, with the majority for shops and classrooms.

Aircraft Firm to Diversify?

A major aircraft company is apparently interested in making other things beside planes. Now being considered are aluminum curtain walls, and possibly aluminum load-bearing walls. The project is now in the hands of market researchers who soon hope to come up with a report on which management can make up its mind.

Anti-Fouling Plug Design

Platinum electrodes are used for two new spark plugs designed for outboard motors and special automotive uses. The plugs have extra long insulator tips, a platinum center electrode embedded in silver, and a fine-wire platinum side electrode. The long-life plugs have high anti-fouling characteristics which make them desirable for use in outboard motors, sports cars and other vehicles with high performance engines.

Atoms Spot Moisture

Atomic techniques are solving an old foundry problem—maintaining proper moisture content in sand molds. Developed by a major auto lab in cooperation with foundry engineers, the method uses plutonium-239. Its fast neutrons collide with hydrogen nuclei in water atoms in the mold sand, producing slow neutrons that are counted electronically. It's a new way to improve quality and uniformity of molds.

Better Machine Tool Data

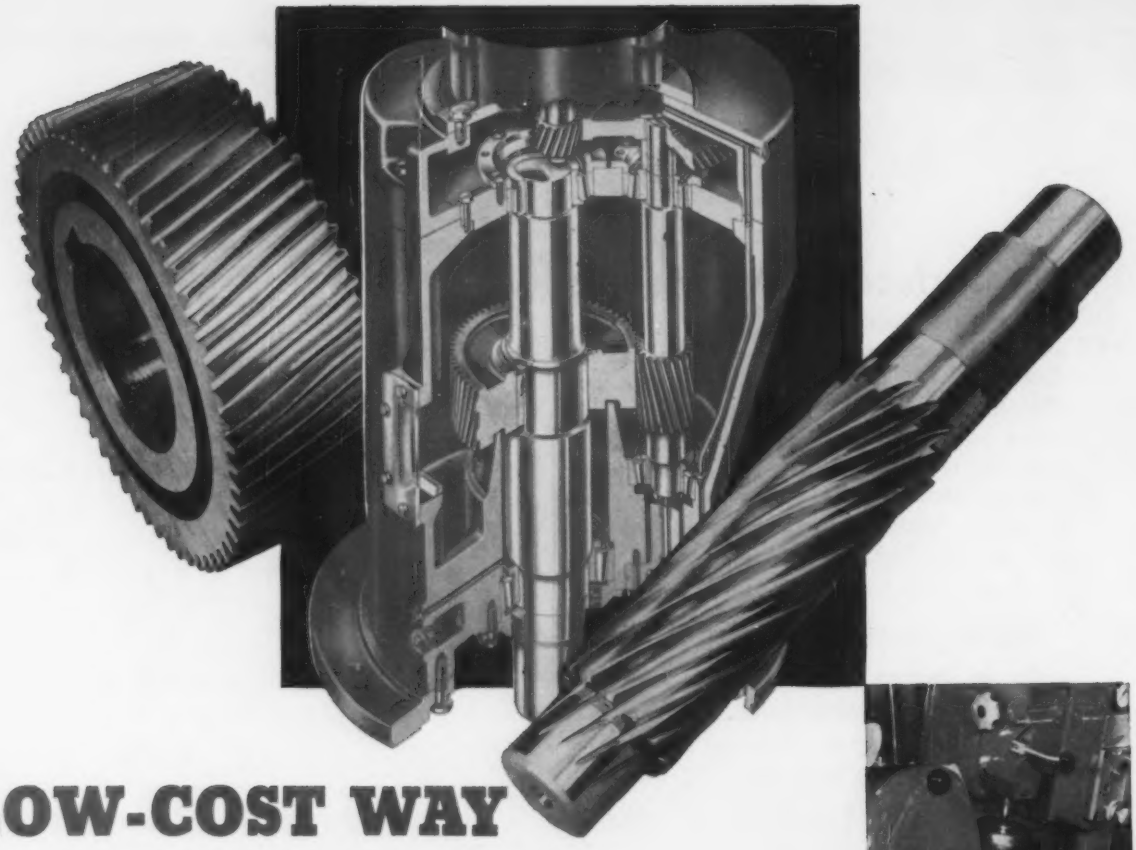
Improved machine tool classification system will be put into effect by the government late this summer. A revised and improved reporting form will give better statistics on production and economic data. Architect of the new system is the Metalworking Equipment Division of the Business and Defense Services Administration.

Reds Need Paperwork Too

Recent travelers behind the Iron Curtain report one major Russian problem is the need for more good old-fashioned capitalist bookkeeping. One visitor to heavy industries found complaint over extreme difficulties in finding the economics of manufacturing operations. The head of one large plant told him bluntly that they needed to follow Western practices in accounting to do an efficient job.

Antimissile Research

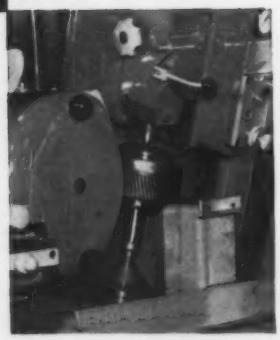
Twelve defense contractors are exploring novel ideas for antimissile defense. A $1.5-million Pentagon contract authorizes them to examine all conceivable means of defeating a missile attack. Radiation devices and gravity waves will claim attention. Contractors are to spend six to nine months identifying likeliest concepts.



LOW-COST WAY to Quieter Gears

Finishing power transmission gears to tolerances measured in "tenths" used to be costly. But not any more: they can now be ground on the No. 12 Fellows-Reishauer Gear Grinding Machine which combines low-cost, high-speed operation with outstanding accuracy. As a result, these heavy-duty industrial mixers now run more smoothly and efficiently than was ever possible before.

The Fellows-Reishauer is built in America by Fellows, under a license from Switzerland's Reishauer Tool Works, Ltd. Fast and simple to set up, it permits economical grinding of single gears as well as long production runs. Capacities are 12" outside diameter for both spur and helical gears; 6¾" face width for spurs. Max. face width for helicals depends on pitch and helix angle.



Gears for a well-known line of industrial mixers are ground to runout tolerance of 0.0005" T.I.R. at high speed and low cost.

Fellows gear production and inspection equipment can probably help you lower your gear production costs, whatever your requirements. The complete line, for gears from 1/16" to 120" P.D., includes Fellows Gear Shapers, Pfauter Gear Hobbers and Fellows-Reishauer Gear Grinders as well as a number of other more specialized machines. For full information, get in touch with any Fellows office.

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6214 West Manchester Ave., Los Angeles 45

THE PRECISION LINE **Fellows** *Gear Production Equipment*

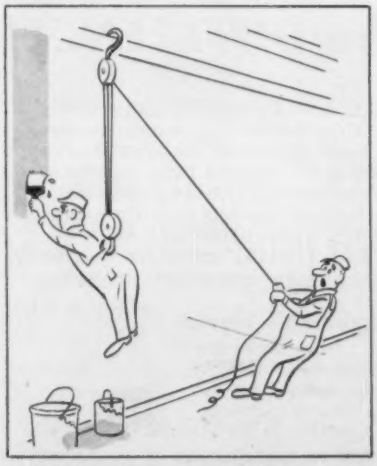
Cliff Hanger

Sir—Your editorial in the Apr. 23 issue of IRON AGE is very intriguing and very significant—"Who is Bluffing — McDonald or the Steel Industry?" I am sure there are millions of people who would like to know.

I hope that the implication of your editorial is true. I am sure you agree with me that any relaxation invites inflation and is detrimental to the American economy.

I hope that the steel industry is not bluffing. Somewhere along the road we must call a halt. There must be a relationship between productivity and remuneration.

I have always had a great deal of respect for your ability to feel the pulse of the steel industry. I sincerely hope that in this instance you are correct. I look forward with a great deal of interest to the final decision.—H. C. Silldorff, Chairman of the Board, G. M. Basford Co., New York.



"Try to be patient until our new safety scaffold arrives!"

Things to Come?

Sir—In trying to maintain the "impossible" Berlin situation, our troops and pilots will meet "volunteers" from Poland, Czechoslovakia, Bulgaria, Romania, Russia, and even China. We cannot declare war on all these nations, but the struggle will be hard.

If this happens while there's a steel strike, the Army may take over the operation of the steel plants.

Afterwards there will be higher taxes, more war bonds, and more inflation.

The present build-up of both the NATO and Warsaw pacts is bound to bring about a "police action" in Germany.

If, after two years, this police action is still going on, nuclear bombs will be brought into action.—W. Trinks, Pittsburgh, Pa.

Front or Rear?

Sir—Reader R. W. Leary's letter in the Apr. 16 issue called my attention to the article in the Mar. 26 issue: "Where Does an Auto Engine Belong?"

Since last November, I have been driving a DS 19 Citroen. Last winter is reported the worst in forty years here in Toronto. This experience has convinced me that neither Mr. Leary, nor the writer of the Mar. 26 article, have presented all the facts. The factor omitted is which end is the driving end.

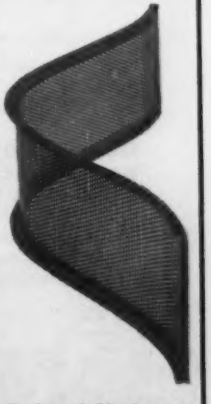
The best possible arrangement is a front wheel drive with engine in front. The worst is rear drive with engine in front. If just one of the Detroit car makers brought out an arrangement like that of the Citroen, the public would, as soon as word got around, stampede to buy it.—G. G. Waite, Sangamo Co. Ltd., Leaside, Toronto, Canada.

Perforated Metal Products and Parts

Pickling Basket

Air Inlet Screen for Oil Burner

We, of course, supply manufacturers with perforated metal sheets and plates in a wide variety of sizes and shapes, from which they produce their own products and parts, but we are also fully equipped to relieve them of a great deal of this work. We weld, spot-weld, or rivet, stiffeners and angles to the pieces and can form or flange them to special shapes as required. The items here shown are typical of hundreds we have furnished to other manufacturers during nearly a half century of successful experience.



Perforated Metal, spot-welded to specially formed angles.

YOU'LL SAVE MONEY in most cases, by placing orders with us for perforated metal parts, to be delivered in lots throughout the year in accordance with your production schedules. Specialized equipment and procedures will usually enable us to do the work at lower cost than it could be done in your own shops. Send us your blue prints and specifications. When given sufficient information, our engineers are often able to make money-saving suggestions and always welcome an opportunity to do so.

DIAMOND MANUFACTURING CO. WYOMING (Wilkes-Barre Area) PENNA.

New Bulletin No. 51, Describes DIAMONTEX Perforated Metal Lay-in Panels for Modern Acoustical Ceilings.

Compare the Production
of these two
DoALL BAND MACHINES

1952 MODEL V36 MACHINE

Obsolete fixed table machines were terrific in their day, using carbon steel blades and manual feed to cut mild steel at a rate of 1.7 sq. in./min.

1959 CONTOUR-MATIC*

Machine hydraulically-powered work table and Demon* H.S.S. saw blade to cut mild steel at 10.1 sq. in./min.

They Look Alike...But *LOOK* at the *DIFFERENCE!*

You'll be amazed at the increased cutting rates, accuracy and finish achieved by new Contour-matic band machines. Here's a typical case:

CONTRACT JOB—splitting high-chrome, high carbon tool steel bushings 13½" O.D. x 8½" I.D. by 31" long. It took 8 hours to split a bushing on the fixed table Model V 36 using carbon steel blade.

FLOOR TO FLOOR TIME CUT 75%—Now the job is put on the power feeding table of a Contour-matic which uses Demon H.S.S. saw blades to split a bushing in just 2 hours. This splitting becomes semiautomatic with accuracy and finish greatly improved. And the tool life is 30 times longer than carbon steel blades.

Yes, there are literally hundreds of other applications where the new Contour-matic can make similar savings over fixed table saws and more expensive machines you are using for shaping cuts, recessing, beveling or cutting contours in the toughest steels. Investigate now to replace obsolete machines that can't keep up with the competitive race for lower costs. Call your local DoALL store for a free demonstration—right in your own plant—or write.

FREE—"Job Spotting" Service

For your evaluation—illustrated case histories of job savings made by Contour-matics over former methods will be mailed to you periodically. Send us your name on company letterhead.

B-57

*Reg. T. M. The DoALL Company

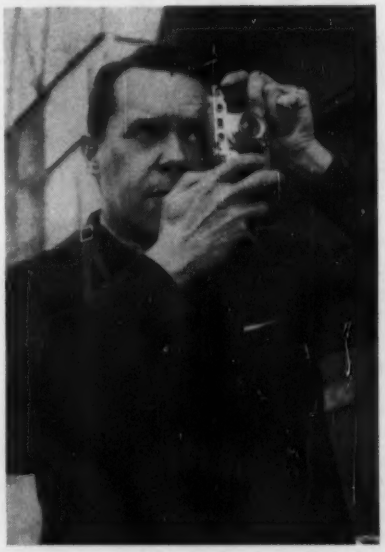
THIS IS A TYPICAL DoALL STORE

The DoALL Company, Des Plaines, Illinois

Four Since the First

Photographer Gene Pyle is a busy fellow. His cover photo on this week's Design Show issue is his fourth IRON AGE cover shot since the beginning of the year.

What's more your national metalworking weekly is only one of the magazines where Gene's work appears. His photographs are also seen in Business Week, Time, Life,



Fortune, Sports Illustrated, and other leading publications.

Versatility — Born in Kansas, photographer Pyle had a varied career as an artist, lithographer, and teacher before adopting lenswork permanently. He's a graduate of Colorado College and the Art Institute of Kansas City.

Gene says his interest in photography began in Italy during World War II when he bought a Rolleiflex and started taking pictures in Florence, Rome, and Venice. After he returned to the U. S. he worked for Time, Inc. in New York with such well-known lensmen as Ralph Morse, Eisenstaedt, Elisofon, and Arnold Newman. He decided to free-lance in 1953 and has headquartered in Detroit for the last two years.

Design Challenge—The subjects he shuttered for this week's cover are Monty Ferar and Carl Sundberg, industrial designers. Mr. Ferar authored our technical feature story this week "Can Product Designers Meet the Automation Challenge?" You'll find it beginning on p. 143. In fact you'll find our entire technical section this week devoted to articles on design problems and their solution. It's our prelude to the Design Engineering Shows which will be held in Philadelphia on May 25-28. Included, also, is full information about the show itself.

And Now Alaska

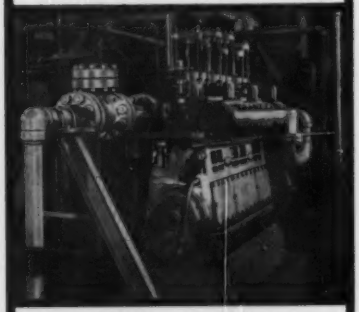
In our final issue for 1958 we ran a letter from the Hawaiian Electric Co. commending us for our help in bringing a steel mill to Hawaii. The latter noted, "Interest of Western Canada Steel, Ltd., in this project (formation of Hawaiian Western Steel, Ltd.) is directly due to the fact that your IRON AGE West Coast Editor, Mr. Raymond Kay, visited the Islands early in 1957."

So much for metalworking in our newest state. But what about the semi-newest, the 49th?

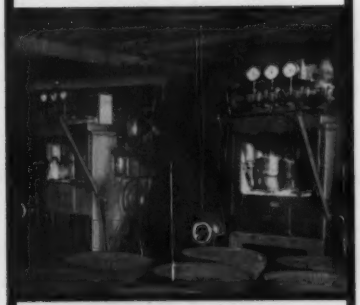
Well, here comes a letter from Alaska Steel Mills, Inc., Fairbanks, Alaska. It reads: "Our merchant bar mill at Seattle is going into production and we would appreciate a listing in your steel price section and key to steel producers. Our products will be merchant and reinforcing bars."

There you have it. As far as metalworking is concerned things are really happening in the latest additions to our union.

COMPLETE CENTRAL HYDRAULIC SYSTEMS FOR



die casting



extruding

plastics molding

From Aldrich you get all the benefits of unified engineering plus the newest in pumping equipment. Aldrich Direct Flow Pumps to 2500 hp. Aldrich-Groff Controllable Capacity pumps to 125 hp. Pressures to meet your requirements. Write for data.

LOWER PUMPING COSTS WITH

ALDRICH

Aldrich Pump Company
8 Pine Street, Allentown, Penna.

From General Motors...

A RELIABLE SOURCE OF QUALITY DIE CASTINGS

Brown-Lipe-Chapin offers you extensive die casting, electroplating and stamping facilities for immediate volume production!

In a new diversification program, Brown-Lipe-Chapin offers its die casting and metal stamping services to manufacturers outside the automotive field. Leaders in the field of quality bright work, Brown-Lipe-Chapin now seeks to contribute proven quality and add new sales appeal to your product.

Brown-Lipe-Chapin is experienced and equipped to accept the challenge of your most intricate design . . . your most difficult part, even if it's up to six feet in length!

You'll get results in reliability! A fully qualified staff of engineers—experienced and skilled in all phases of die casting and steel or aluminum stamping—will recommend the best and most economical way of producing your parts. Also, you will find that the low cost includes a number of important Brown-Lipe-Chapin extras that add nothing to the price, yet may add significant advantages to your product.

Here are some important Brown-Lipe-Chapin extras:

- Facilities for mass-producing die castings and steel or aluminum stampings, with related processes of anodizing, electroplating and painting *all under one roof.* Plus the fact that these facilities can be readily adapted to meet production demands of yearly model change-overs.
- Quality that's rigidly controlled step by step . . . quality that has been proven by successfully meeting the rigid standards and specifications of the automotive field for years.
- Advance research in ways and means of improving products and methods. For example, Brown-Lipe-Chapin recently achieved a new dimension in durability with the first major advance in the chrome plating industry in twenty-five years.
- Mass-production experience that assures delivery to meet your schedules *right on time.*
- A guarantee to every new customer that Brown-Lipe-Chapin will continue to be a source for their die casting and stamping requirements for as long as they may want to specify.

We welcome the opportunity to talk to you about your current needs and future plans. Contact Brown-Lipe-Chapin, Division of General Motors Corp., Syracuse, New York.

SYRACUSE, N. Y.
This 10-acre plant has complete modern facilities to stamp, die cast, anodize, plate and paint parts to exact specifications.

ELYRIA, OHIO.
This 15-acre plant is equally capable of supplying your volume requirements. And its central location means fast delivery.

GM GENERAL MOTORS

RELIABILITY by BROWN·LIPE·CHAPIN

DIVISION OF GENERAL MOTORS CORPORATION

COMING EXHIBITS

Design Engineering Show — May 25-28, Convention Hall, Philadelphia. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Material Handling Show—June 9-12, Public Auditorium, Cleveland. (Hanson & Shea, Inc., One Gateway Center, Pittsburgh 22.)

Industrial Finishing Show — June 15-19, Detroit Artillery Armory, Detroit. (Information: H. J. McAleer, 3171 Bellevue, Detroit 7, Mich.)

Instrumentation Show — Sept. 21-25, International Amphitheatre, Chicago. (Instrument Society of America, 313 Sixth Ave., Pittsburgh 22.)

Metal Show — Nov. 2-6, International Amphitheatre, Chicago. (American Society for Metals, 7301 Euclid Ave., Cleveland 3.)

MEETINGS

MAY

American Institute of Chemical Engineers—National meeting, May 17-20, Muehlebach Hotel, Kansas City, Mo. Institute headquarters, 25 W. 45th St., New York.

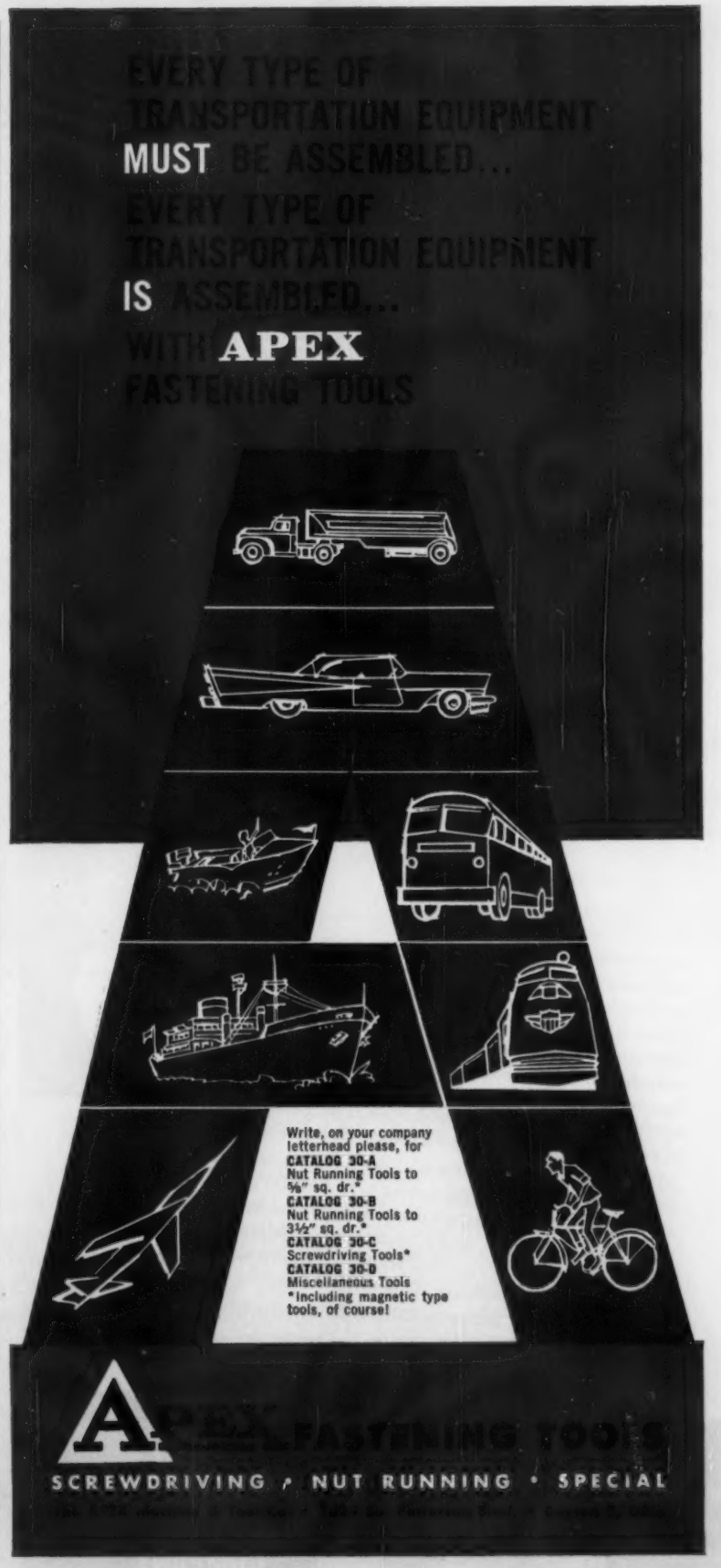
Industrial Heating Equipment Assn., Inc.—Annual spring meeting, May 17-20, The Homestead, Hot Springs, Va. Association headquarters, 1145 19th St., N. W., Washington 6, D. C.

The Magnesium Assn. — Annual meeting, May 17-20, Sea Island, Ga. Association headquarters, 122 E. 42nd St., New York.

Aluminum Wares Assn. — Annual meeting, May 18-19, The Greenbrier Hotel, White Sulphur Springs, W. Va. Association headquarters, 1806 First National Bank Bldg., Pittsburgh.

Electronic Industries Assn. — Annual convention, May 20-22, Sheraton Hotel, Chicago. Association headquarters, 1721 DeSales St., N. W., Washington 6, D. C.

(Continued on P. 16)



THE RIGHT

IN CHECKERS

General Refractories offers **superior** high duty fireclay checker brick; possessing all four properties recognized as the criteria for long life in regenerator chambers — high density, low porosity, high strength and refractoriness.

High density and low porosity are needed to insure volume stability, optimum heat transfer and minimum penetration of flux-bearing gases. High refractoriness, coupled with these other properties, is needed to withstand the temperatures prevalent in most regenerator chambers.

Any one of these properties by itself cannot describe an excellent checker. It is the combination of all these properties in one product that produces a superior checker brick.

GREFCO checker brick possess *all* these attributes. Manufactured from select, highly refractory fire clays; by GREFCO's unique double-tempering process; pressed in special dual-action, dearing power presses, fired to high temperature in tunnel kilns; and given a final rigid inspection for accurate size and quality; General Refractories' "C" brands are superior checkers. Surely, "THE RIGHT MOVE IN CHECKERS" is to — GREFCO!

WRITE FOR NEW LITERATURE ON CHECKER BRICKS

GENERAL REFRACTORIES COMPANY
Philadelphia 2, Pa.

EXHIBITS, MEETINGS

(Continued from P. 15)

Aircraft Industries Assn. of America — Semi-annual meeting, May 20-22, Williamsburg Inn, Williamsburg, Va. Association headquarters, 610 Shoreham Bldg., Washington 5, D. C.

Anti-Friction Bearing Manufacturers Assn., Inc. — Semi-annual meeting, May 20-22, Edgewater Beach Hotel, Chicago. Association headquarters, 60 E. 42nd St., New York.

Society for Experimental Stress Analysis — Exhibit and national spring meeting, May 20-22, Sheraton Park Hotel, Washington, D. C. Society headquarters, Central Square Station, Cambridge 30, Mass.

Industrial Wire Cloth Institute — Annual resort meeting, May 23-26, The Greenbrier Hotel, White Sulphur Springs, W. Va. Institute headquarters, 75 West St., New York.

Malleable Founders' Society — Annual meeting, May 25-26, The Homestead, Hot Springs, Va. Society headquarters, 1800 Union Commerce Bldg., Cleveland.

The Commercial Chemical Development Assn.—Spring meeting, May 25-26, Pocono Manor, Mt. Pocono, Pa. Association headquarters, 60 East 42nd St., New York 17.

Wire Reinforcement Institute — Annual spring meeting, May 25-26, The Greenbrier, White Sulphur Springs, W. Va. Institute headquarters, National Press Bldg., Washington, D. C.

Concrete Reinforcing Steel Institute —Annual meeting, May 25-30, The Greenbrier, White Sulphur Springs, W. Va. Institute headquarters, 38 S. Dearborn St., Chicago.

American Iron & Steel Institute— Annual meeting, May 27-28, The Waldorf-Astoria, New York. Institute headquarters, 150 E. 42nd St., New York.

32- and 56-inch x 96-inch, 4-high reversing hot strip mill at the Terre Haute plant of Anaconda Aluminum Company.

BLAW-KNOX

ALUMINUM REDUCTION MILLS

Blaw-Knox designs and builds a full range of mills for the reduction of aluminum and other non-ferrous metals. Other Blaw-Knox equipment for the metals industry includes complete rolling mill installations and auxiliary equipment for ferrous and non-ferrous metals, iron, alloy iron, and steel rolls, Blaw-Knox Medart cold finishing equipment, carbon and alloy steel castings, fabricated steel plate or cast-weld design weldments, steel plate equipment, and heat- and corrosion-resistant alloy castings.

BLAW-KNOX

BLAW-KNOX COMPANY

Foundry and Mill Machinery
Blaw-Knox Building · 300 Sixth Avenue
Pittsburgh 22, Pennsylvania

PROTECTED BY Bonderite PARKER RUST PROOF CO. QUALITY CORROSION RESISTANT

Bonderite's best for Aluminum, too!

Better paint adhesion, better corrosion control

Here's the most famous name in the whole metal treatment field. Bonderite!

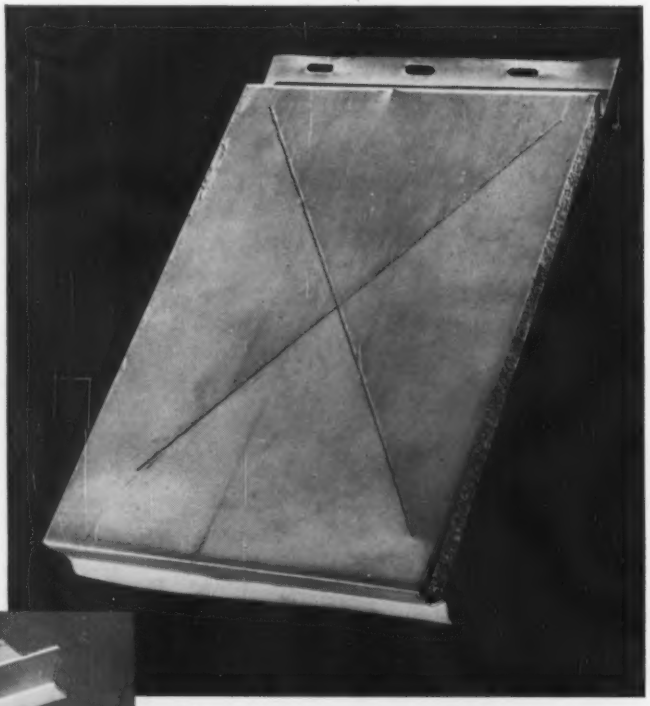
This is the product name that has meant finest finish protection and customer satisfaction to buyers of automobiles, home laundry equipment, refrigerators, metal furniture and other painted metal products for a generation.

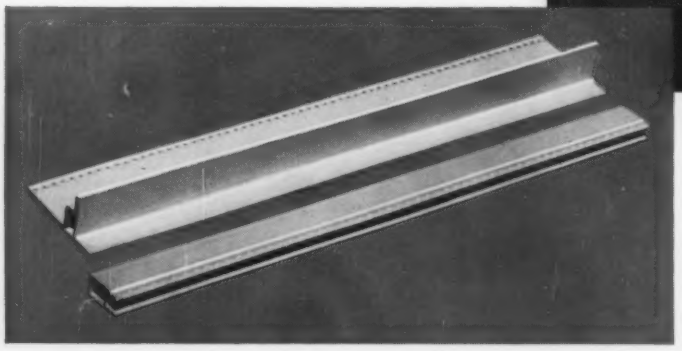
This year, over 10 million Bonderite seals will be used on metal products to tell buyers they are getting the plus values of Bonderite protection.

As protection for aluminum, Bonderite's performance is equally spectacular. It controls corrosion, anchors paint.

Sell aluminum siding, awnings, windows, doors and panels that are protected by Bonderite. Sell with complete confidence that the product's good looks will last and last!

Make it a test of quality. Ask the manufacturer, "Are you using *Bonderite* on this product?"





(Above): Regular 1-coat paint finish over section of Bonderite-treated aluminum siding. Formed after painting. Tested in salt spray 1500 hours. (Siding by Hastings Aluminum Products, Inc., Hastings, Mich.)

(Left): Aluminum window and screen frame sections Bonderized, painted in the strip, formed after painting. No breaks in finish anywhere! (Treated, painted strip furnished by Hastings Aluminum Products, Inc.)

Since 1914—leader in the field

Parker Rust Proof Company

2197 E. MILWAUKEE, DETROIT 11, MICHIGAN

BONDERITE corrosion resistant paint base	BONDERITE and BONDERLUBE aids in cold forming of metals	PARCO COMPOUND rust resistant	PARCO LUBRITE—wear resistant for friction surfaces	TROPICAL—heavy duty maintenance paints since 1883

**Bonderite, Bonderlube, Parco, Parco Lubrite—Reg. U.S. Pat. Off.*

MACHINE TOOLS can be TAUGHT

. . . to produce closer tolerances, Faster and Automatically . . .

. . . by use of *MICROtrol** gaging and control elements, selected combinations of these *MICROtrol* 160 elements permit you to control production automatically. They will inspect each piece, sort out the rejects, and tell the operator and/or machine tool *when* and *how much* correction is needed. Simple and flexible, 54 *MICROtrol* elements can automate all of your production immediately . . . or by stages.

MICROtrol electronic inspection and controls make needed corrections before rejects pile up . . . without stopping the machine tool to check work. *MICROtrol* takes pressure off the operator . . . allows him to produce more . . . with greater accuracy.

Centerless grinding tolerances up to .000025 are possible by adding an INCHWORM® motor to the *MICROtrol* 160 system. When used in a closed loop system, *MICROtrol* elements automatically gage work, feed back correcting information to the INCHWORM, compensate for wheel wear . . . instantaneously.

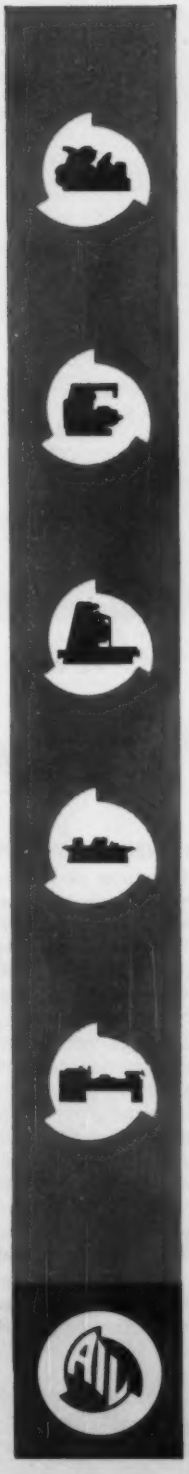
SEE IT WORK IN YOUR PLANT . . .

at Our Expense!

The INCHWORM can be installed on your centerless grinder in less than an hour—and proves itself immediately. We will install it in your plant, *on approval*, upon the recommendation of our sales engineer.

Contact your nearest Cutler-Hammer office or write AIL for full details, and descriptive literature.

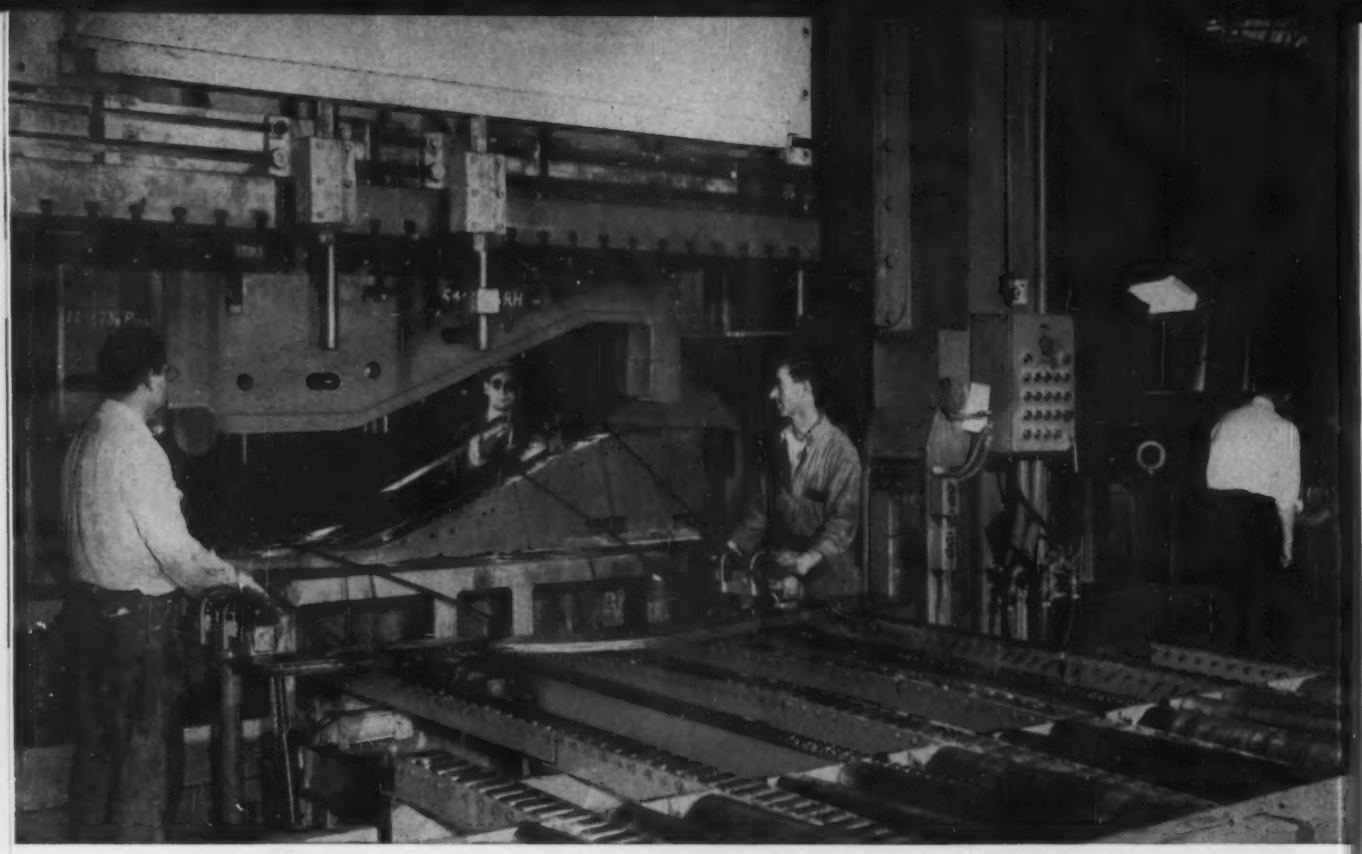
* TRADE MARK



AIRBORNE INSTRUMENTS LABORATORY

1345 NEW YORK AVENUE, HUNTINGTON STATION, L. I., NEW YORK

A DIVISION OF CUTLER-HAMMER, INC.



New design permits tooling up of one bolster *(right)* while press is producing parts from die on other bolster. This press, at the A. O. Smith Corp. plant, in Milwaukee, Wis., is expected to achieve 94% utilization.

Press downtime . . . down from hours to minutes

THE NEW HAMILTON SLIDING BOLSTER PRESS:

- **Reduces parts inventory**
- **Meets changing schedules on time**
- **Cuts number of presses required where die changing is frequent**
- **Eliminates long and costly die setting operations**
- **Provides storage area within press frame**
- **Available in all types and tonnages**

No longer need hours – and sometimes days – be wasted in unproductive press downtime while changing dies for another run. This major step in stamping and forming press room operations is made possible with the Hamilton Sliding Bolster press.

A 1250-ton 2-point, top-drive press equipped with two sliding bolsters recently installed at a Midwest automobile parts plant is proving the economies of the innovation–on parts up to 12 ft. long.

While the press produces parts from a die mounted on its operating bolster, a second bolster can be tooled for the next run. Changeover time is negligible –pushbutton-controlled hydraulic motors quickly and positively position the second bolster for speedy startup and production of the next part.

In the open position, the bolster is clear of the press frame for easy die change and setup. Crane handling of heavy dies is absolutely unobstructed.

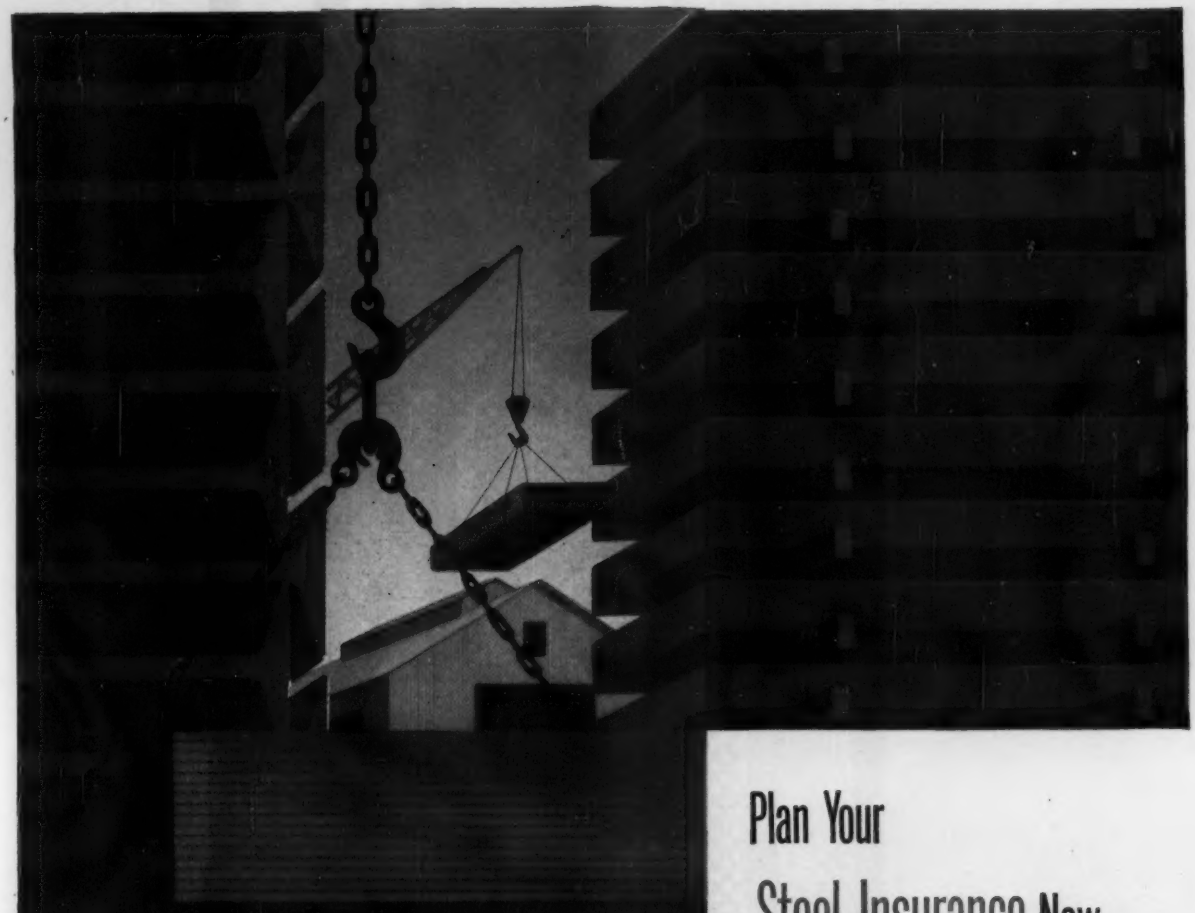
For further information, write Dept. 2-E

Pushbutton-operated bolsters slide into place in minutes. Downtime for changing dies is virtually eliminated.

Hamilton Division Hamilton, Ohio

BALDWIN · LIMA · HAMILTON

Diesel engines • Mechanical and hydraulic presses • Can making machinery • Machine tools & general machinery



Plan Your Steel Insurance Now

With steel supply tightening up again and the possibility of a real scarcity in the months to come, it's nice to have your orders for plain and fabricated steel in the hands of a reliable and well-supplied organization.

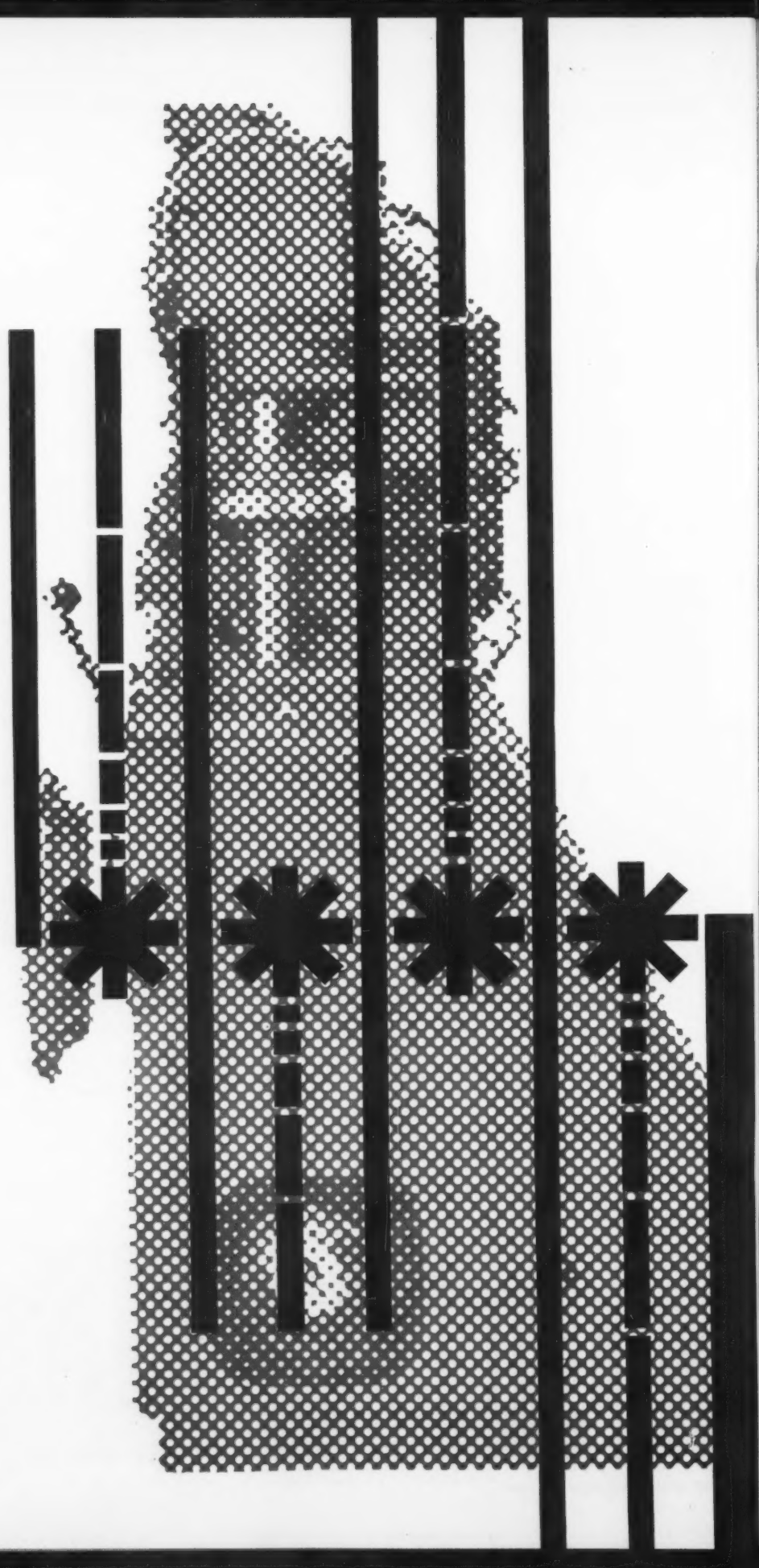
Steel buyers everywhere know Levinson's reputation for having steel on hand . . . and for "fabrication that fits."

just . . . Leave it to **LEVINSON**

Warehousers, fabricators, designers of steel for over half a century

the **LEVINSON STEEL COMPANY**

Pittsburgh 3, Pa.
Phone: HUbbard 1-3200

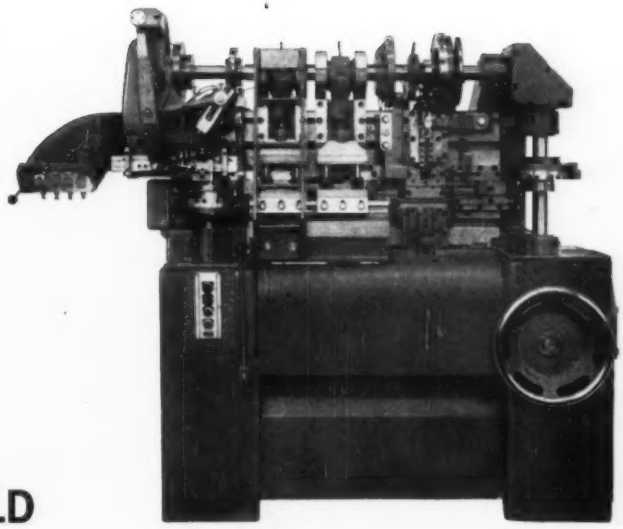

EXCITEMENT

Once in a blue moon, a really exciting new production machine is developed . . . and this is it!

It's the Torrington **Verti-Slide** which promises a genuine revolution in the production of just about everything in strip forming that is now being produced by progressively tooled presses.

Single-handed, the Torrington **Verti-Slide** has already demonstrated its ability to replace as many as six presses in high speed precision production of complex parts.

Cooler heads than ours are telling **us** that it's the most exciting new development in its field in half a century.



IN THE PRODUCTION WORLD

Write or call today for complete data—or a Torrington sales engineer.

THE TORRINGTON MANUFACTURING COMPANY
TORRINGTON, CONNECTICUT · VAN NUYS, CALIFORNIA · OAKVILLE, ONTARIO

FREE DATA FILES

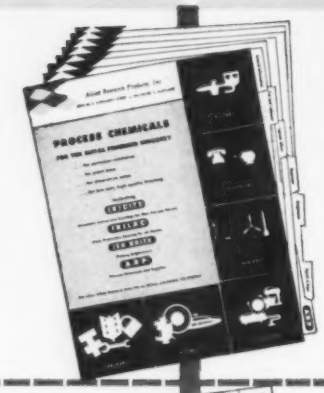
on

Allied Research LINES

LOOK FOR THE DIAMONDS—SIGN OF FINISHING QUALITY

METAL FINISHING PROCESSES

A complete line of quality products and processes developed primarily as a result of helping manufacturers like yourself solve their metal finishing problems. If one of our present products does not meet your needs, we'll be glad to work with you to find an answer to your problem.



IRIDITE® Chromate Conversion Coatings for Non-Ferrous Metals.

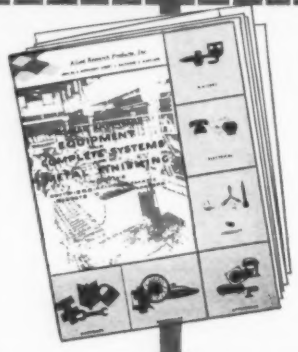
IRILAC™ Clear Protective Coatings for All Metals.

ISOBRITE® *Chemically Different* Plating Brighteners.

ARP® *Process chemicals.*

EQUIPMENT AND COMPLETE SYSTEMS for Metal Finishing

Process Engineered—Single pieces of equipment or all equipment necessary for a finishing operation—evaluated, designed, fabricated, installed and tested to match exactly your particular process. Ask about our *Process Engineering Service.*



WAGNER RECTIFIERS

Silicon and Selenium, built to exacting specifications for long life, trouble-free service.

WAGNER AUTO-LOADERS

for fast, economical transfer of racks and parts, conveyors to plating machines, between conveyors.

AUTOMATIC AND SEMI-AUTOMATIC PLATING MACHINES

BARRELS, TANKS and other equipment.

CHEMICALS AND SUPPLIES

Prompt service on a wide variety of daily-use necessities for the plating room, delivered from warehouse stocks strategically located in cities in metalworking areas.

FLAT-TOP® **ANODES**

In copper and zinc.

LECTROCOP® **FLAT COPPER ANODES**

CADMIUM, WHITE BRASS AND TIN ANODES in most efficient shapes. Acid Replacements, Buffs, Chemicals, Cleaners, Maintenance Materials.

NICKEL RECASTING SERVICE

Ask your Allied Field Engineer about our Subscription Plan which combines your new nickel purchases with a service to recast *your* butts and spears, resulting in substantial savings.

Allied Research Products, Inc.

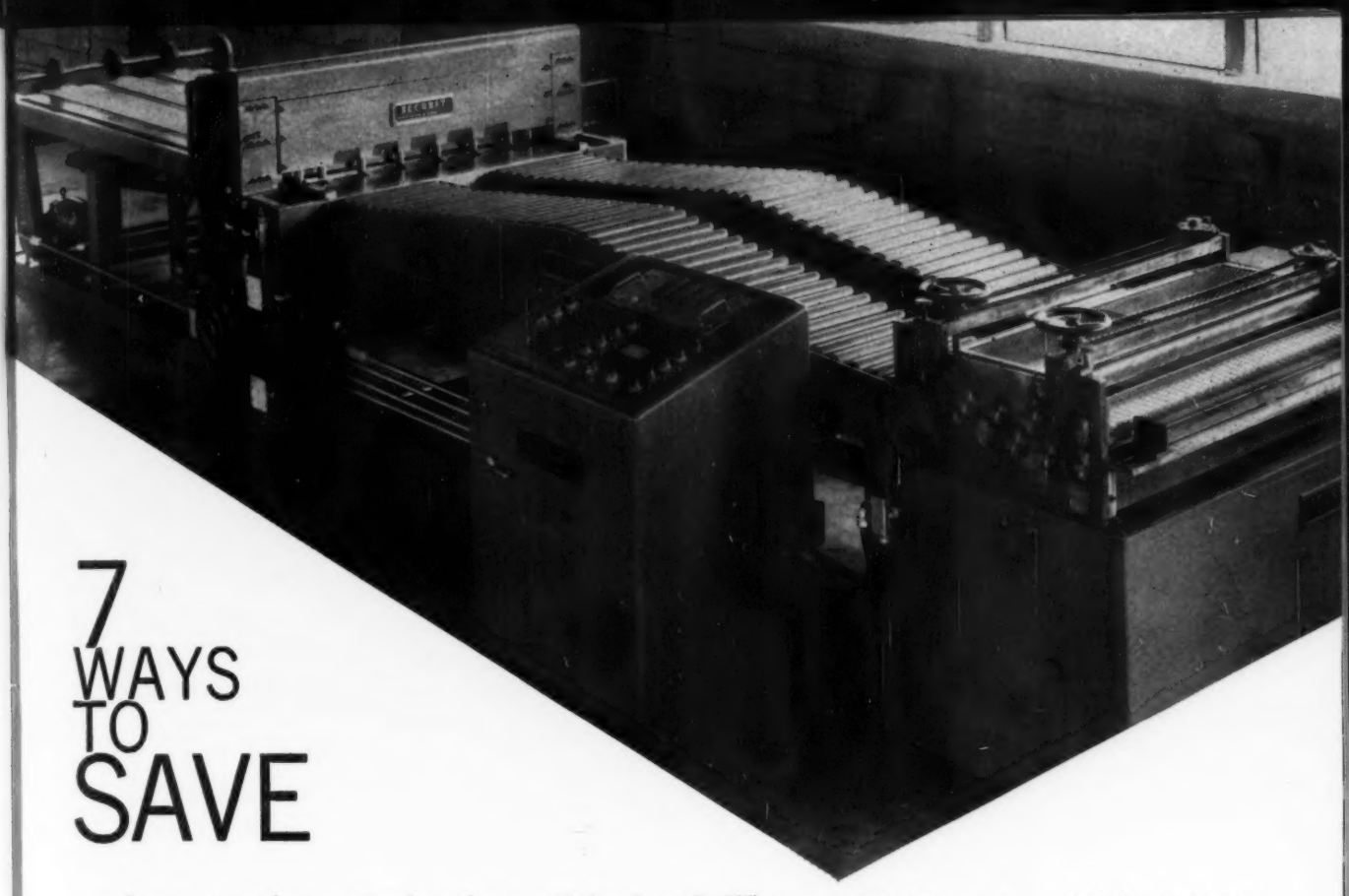
4004-06 EAST MONUMENT STREET

BALTIMORE 5, MARYLAND

Branch Office: 400 Midland Avenue, Detroit 3, Michigan

Chemical and Electrochemical Processes, Anodes, Rectifiers, Equipment and Supplies for Metal Finishing.

WRITE TODAY FOR COPIES of these useful files describing technical details of our complete line, OR, phone your Allied Field Engineer. He's listed under "Plating Supplies" in your 'phone book.



7 WAYS TO SAVE

Are you paying a premium for metal in sheets? Why not buy your metal in coils and save SEVEN ways: On initial metal cost . . . on scrap loss . . . on labor costs . . . on inventory costs . . . on fewer operations . . . on handling costs . . . on storing costs.

You can do all this with a SECREST Automatic Decoiling and Cut-To-Length Line. Let the line pay for itself in a very short time and pocket the savings.

NOW for the FIRST TIME we offer a standard LOW COST line for mild steel, stainless, aluminum and other metal in coils. Complete line operated from central console —like an adding machine. Just push button for length and number of sheets. Make length changes without stopping line.

Contact us or any of our dealers throughout the country. You have everything to GAIN, nothing to lose.

PHILADELPHIA • PITTSBURG • CLEVELAND
CINCINNATI
McBeth Machinery Co.

NEW YORK CITY
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WEST PALM BEACH
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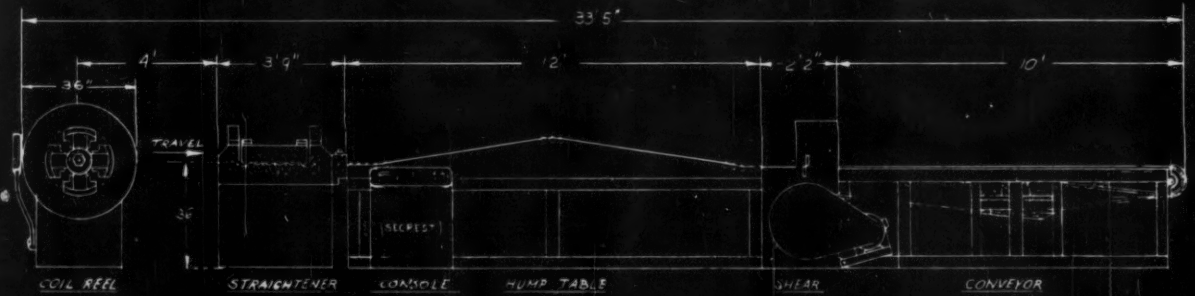

4' x 12 ga. standard line (Other sizes available—up to 10 ga., widths to 72")

Secrest Machine Company | 1507 M Street, N. W.
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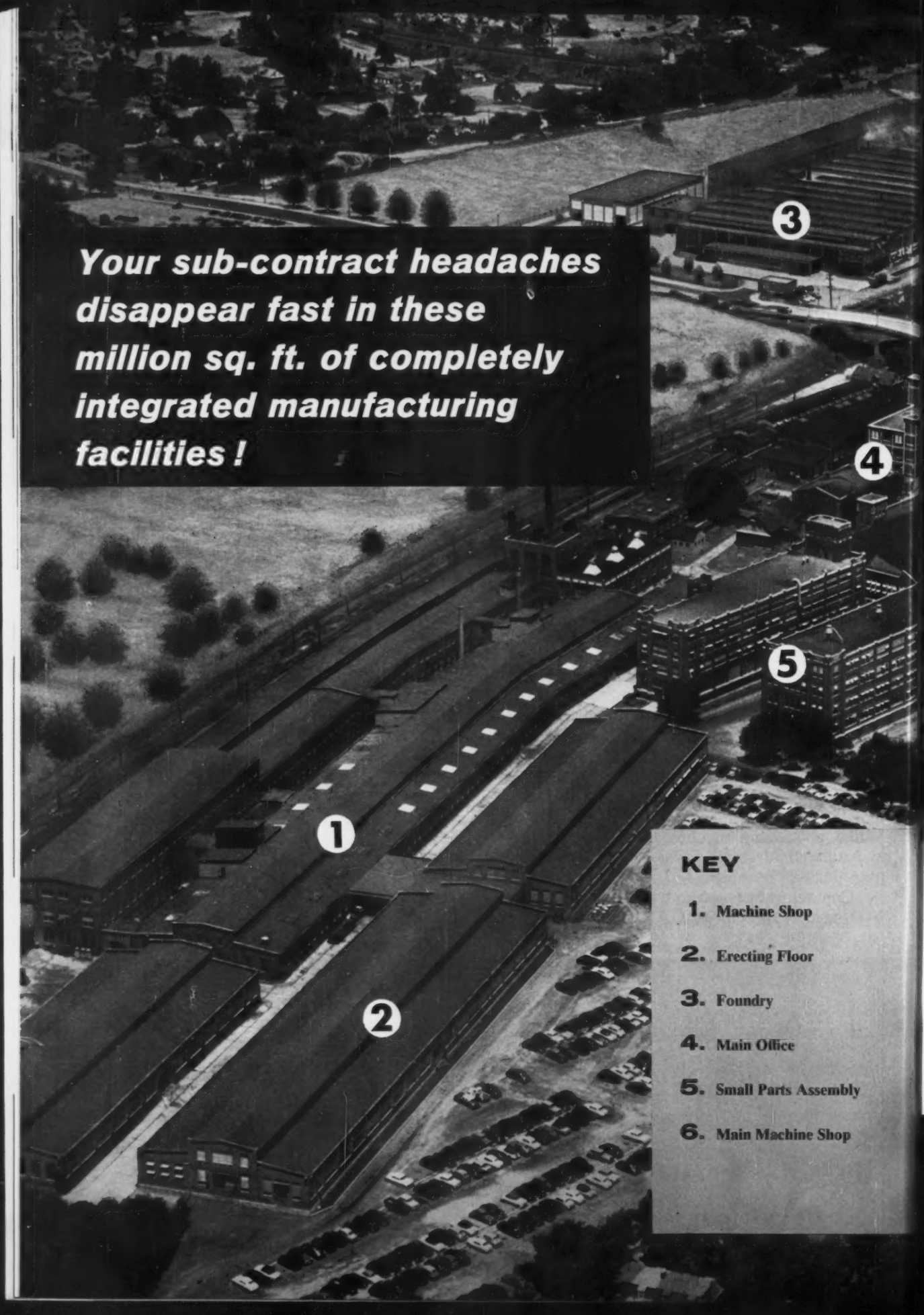
Your sub-contract headaches disappear fast in these million sq. ft. of completely integrated manufacturing facilities !
1
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KEY
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2. Erecting Floor
3. Foundry
4. Main Office
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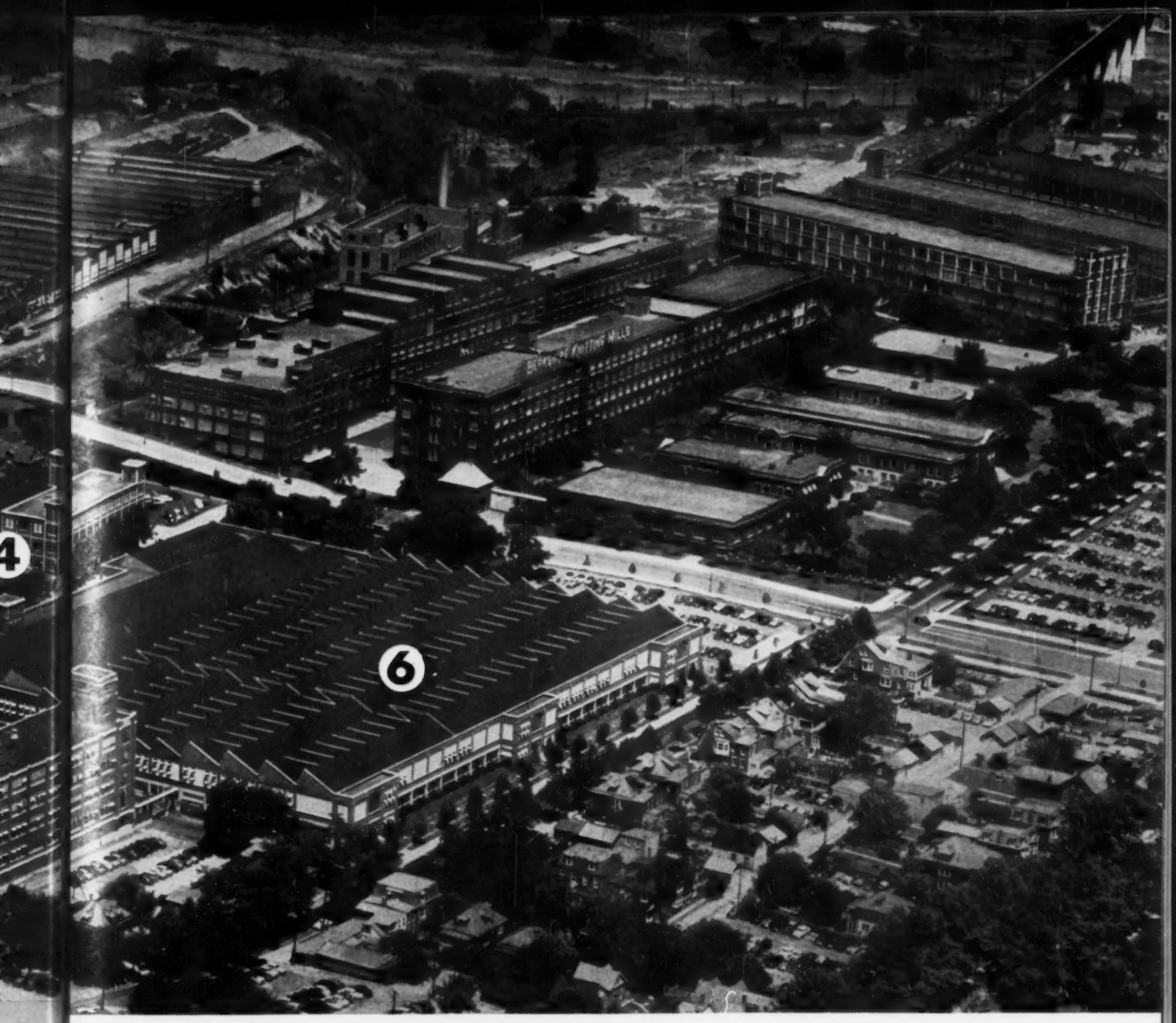


Nothing's quite so important in sub-contracting as *single* responsibility . . . one single responsible source that you can depend on for quality, accuracy, and on-time delivery of your components, assemblies and complete machines.

You get all this when you work with one of the world's largest, most modern and completely integrated manufacturers, whose 65 years' experience in precision (tolerance to 10ths) manufacturing is available to you *now*, on either a short or long-term basis.

Textile Machine facilities include 1200 *modern* machine tools of all types and sizes, a completely mechanized foundry (one of the country's largest), 3000 skilled craftsmen, including a corps of the industry's top designers and engineers.

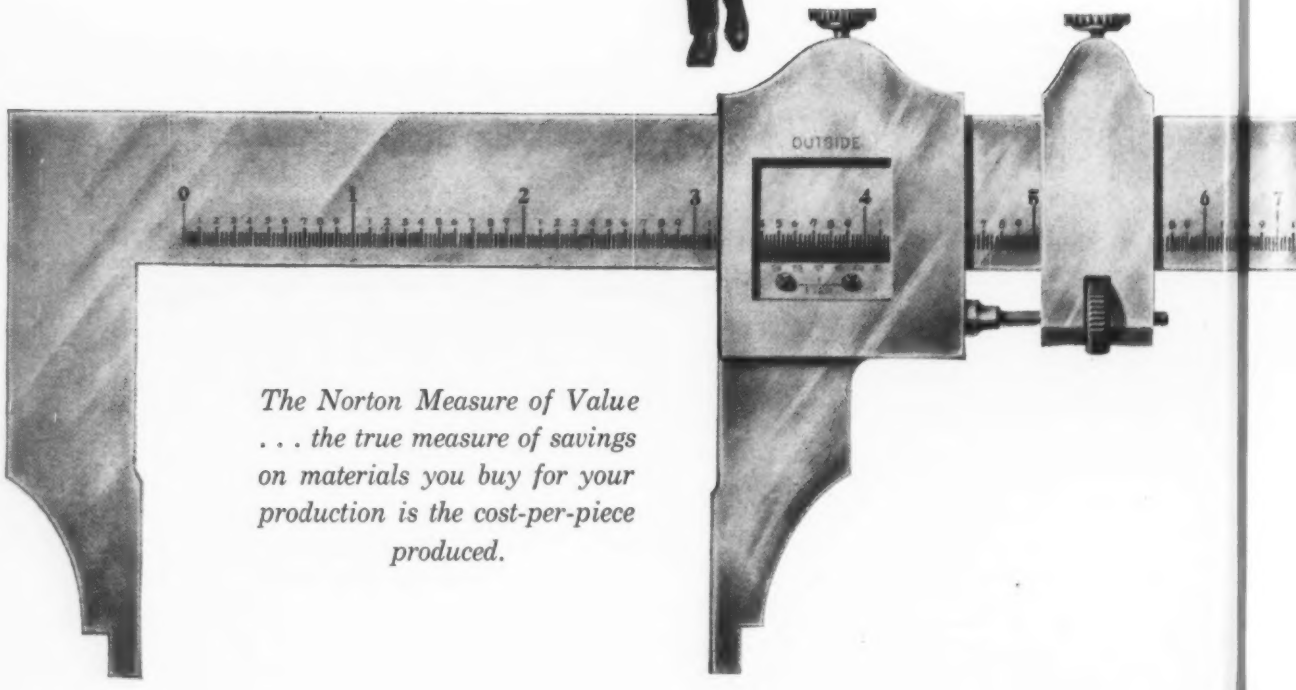
Combine these facilities with electronic punch card production scheduling controls and quality control techniques—and you've got the perfect answer to all your sub-contract problems . . . right *under one roof*.

For more details, or for latest Facilities File Folder, call or write:

TEXTILE MACHINE WORKS

Contract Division • Reading, Pennsylvania

Call your Norton Man — he has the experience, the products, and knows how to save you money where it counts. There's a Norton expert in the fields of — abrasives, grinding machines, refractories.



The Norton Measure of Value . . . the true measure of savings on materials you buy for your production is the cost-per-piece produced.

Economists could argue the definition of the value of a grinding wheel in many ways. But it would usually come down to this — What is it worth to the purchaser.

You can buy less expensive grinding wheels than Norton wheels and save on immediate cost. But if the lower cost wheels do not perform their jobs efficiently or cause production delays because of poor quality or wheel misapplication — you haven't made a bargain — you've made a costly mistake.

The only accurate measure of the value of a grinding wheel is how much it produces for you per dollar cost — not merely how much you paid for it. Here is why Norton grinding wheels are worth more to you —

Norton Company gives you the most advanced research engineering and manufacturing facilities in the entire abrasive field — and you get this great scope of detailed knowledge on a personal basis — your Norton Man.

Every Norton Man starts his career by spending a minimum of one year in a carefully planned training course in the Norton plant and a comparable period of training in the field to assure a broad, thorough understanding of grinding before he goes "on his own." The average experience of all Norton Men in the field is 15 years in addition to their specialized training. The Norton Man is the most knowledgeable man in abrasives that you can consult. Make him your consulting abrasive engineer.

He will make an Abrasive Requirement Study for you.

You can produce greater savings than you can buy

This study lists the correct specifications for each abrasive job in your plant to assure you lowest cost-per-piece produced. He is also available for complete field testing on specific problems.

For example, your Norton Man can increase production by pointing out ways for better wheel usage and fewer wheel changes. He has the widest selection of grinding wheels in the industry from which to select the best wheel for new product grinding operations and for improving your current grinding jobs — both at the lowest cost. And with Norton grinding wheels you can be sure of precise duplication order after order.

Norton offers true abrasive economy. Economy that pays off in lower cost-per-piece produced. Call your Norton Man. NORTON COMPANY, General Offices, Worcester 6, Mass.

W-1893

NORTON
ABRASIVES

Making better products... to make your products better

New series of precipitation-hardenable 18-8 stainless alloys combines corrosion resistance, high hardness, strength at high temperatures, and machinability. Pick the combination of properties best suited to fulfill the needs of *your* application.

New stainless steel alloys by Cooper Alloy

Where can you use them? Cooper Alloy Corp., whose name has for the past 36 years been associated with outstanding developments in casting of stainless steel, now brings American industry another unusual first: a series of 18-8 stainless alloys which combine corrosion resistance, high hardness, high strength and machinability. They maintain these properties even at temperatures up to 1400°F. In particular, they resist corrosion of the pitting type, and the detrimental erosion effects of velocity and suspended abrasives which accentuate corrosion damage.

Prior to the appearance of this new series, the physical properties of stainless alloys which afforded corrosion resistance were precisely those which reduce hardness, and vice versa. Cooper Alloy research has found a way to combine these desirable properties, filling a hitherto existing void in the area of high strength plus high corrosion resistance.

Details of the new Cooper Alloy PH-55 alloys are being reported in the technical press. The following information, therefore, is presented as a quick summary. There are three alloys in the series, as follows:

PH-55A is a high-strength, high-hardness alloy designed for corrosion-erosion and corrosion-abrasion conditions. Outstanding pitting resistance.

PH-55B is a high-strength alloy of greater ductility and lower hardness than "A", for corrosion resistance of parts subjected to a combination of stress and shock.

PH-55C has greater corrosion resistance, hardness, and strength than "A", but less ductility and shock resistance.

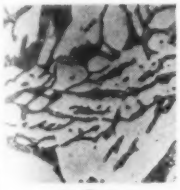
All PH-55 Alloys have higher strengths in the 1200-1400°F. range than do most other corrosion-resistant precipitation-hardening alloys, and also maintain their hardness even after prolonged exposure to these high temperatures.

Available in variety of forms: Primarily are intended to be produced in cast form. Rolled bar stock has, however, been made experimentally. PH-55A is the most readily rolled or forged material; "C" can be worked readily but with slightly greater difficulty, and while "B" can be produced in the wrought form, some care is required. Commercial production of the wrought form is at present under consideration.

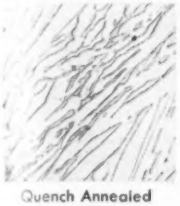
Corrosion Resistance: Generally superior to the 316 alloys in all corrosive media except hot conc. HNO_3. This fact, coupled with other outstanding

MICROSTRUCTURE OF COOPER ALLOY PH ALLOYS

Mag. 250 X
Etchant: 10% Ammonium Sulfate Electrolytic

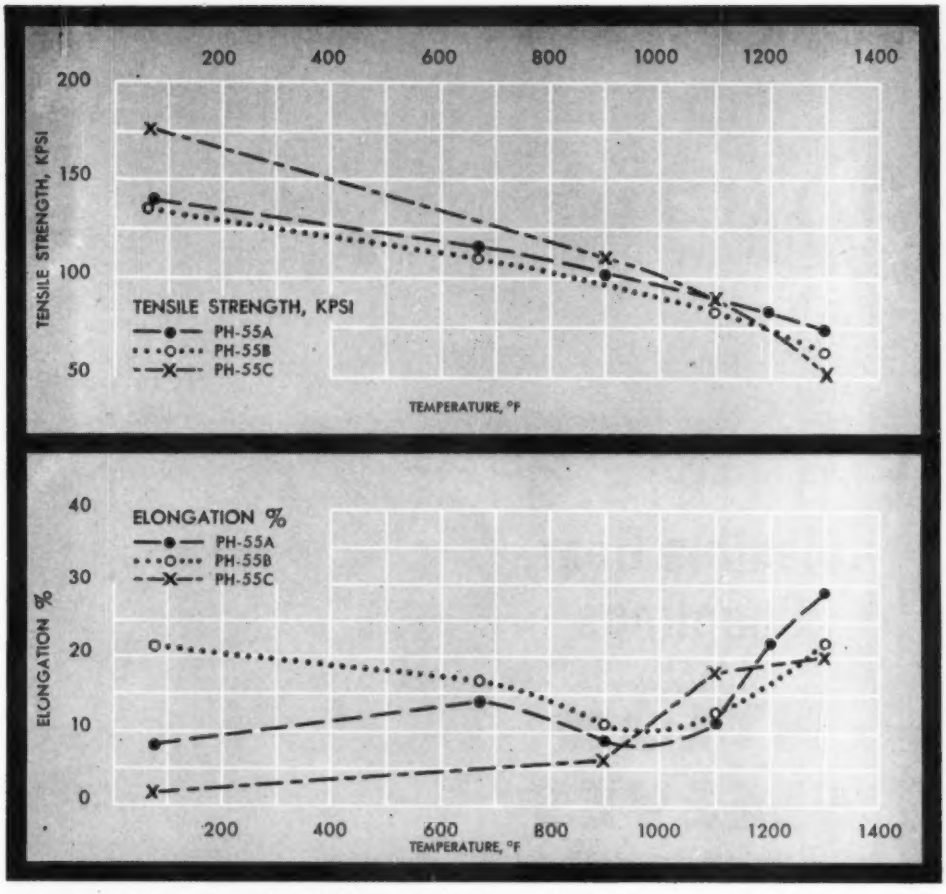


As Cast



Quench Annealed

Precipitation Hardened



Balanced physical properties—Alloy "A" has good hardness and strength, even at elevated temperatures, plus a moderate amount of ductility and toughness. "B", though less hard, exhibits improved ductility and toughness at practically the same strength level. "C" provides maximum combination of hardness and strength at room temperatures when lower ductility can be tolerated.

properties of erosion resistance, high hardness, and high strength, opens many fields of application in chemical processing equipment.

Alloy "A" Resistant to Pitting Corrosion: Pitting, which results in highly localized penetration of the metal without any great overall corrosion, may cause failure through perforation and leakage. This type of failure is especially prevalent in hot aqueous solution.

"A" and "C" Resist Erosion-Corrosion: Another common form of accelerated failure results from the high velocity of the corrodant, such as is found in pumps, and here failures are from corrosion-erosion action, often intensified by the presence of an abrasive. The high hardness and good corrosion resistance of alloys "A" and "C" make these alloys well suited to resist this type of corrosion failure.

Heat Treatment Easy: Alloys "A", "B", and "C", when in the annealed condition, are easily machined, and can be welded when solution-annealed by using rod of similar composition by the shielded-arc technique. Hardening after machining is simple, consisting of a low-temperature anneal of 900°F. for 8 hours, followed by furnace or air cooling.

Where can YOU use these alloys? The high hardness and resistance to corrosion-erosion and abrasion of "A" and "C" indicate their use as pump castings and impellers, and in fact any place where velocity, abrasion, and wear are encountered under highly corrosive conditions. "A"'s extreme resistance to pitting corrosion especially adapts it to use in marine hardware, and in handling of bleach solutions in dyeing and textile plants. "B", with its high strength and ductility, lends itself to vibratory and highly stressed corrosive applications in such equipment as disintegrators and pressure reactors. Patents have been applied for or granted on the PH series of alloys.

The exceptional strength of all three alloys, especially "A", in the 1100-1400°F. range, suggests use in hot missile and supersonic aircraft parts. To date a number of "A" alloy applications in this field have been standing up remarkably well, and it is predicted that quite a few previously insurmountable corrosion problems may be licked through the use of these new alloys.

For further information that may help you solve *your* corrosion-resistant problems, write to Cooper Alloy Corp., Hillside, N.J.

COOPER ALLOY

the most important advance in couplings since Sier-Bath's flangeless design!

new nyflex

Flexible Gear Couplings WITH NYLON SLEEVES

- No lubrication required
- Takes more misalignment than standard gear couplings
- Top performance in horizontal or vertical positions
- Weighs only 3½ pounds
- Low in price
- Speeds to 5000 rpm
- 1⅛" max. shaft capacity

ONLY 5 PARTS

Assembles, disassembles in seconds, no special tools needed!

This NYFLEX flexible gear coupling has a one-piece sleeve weighing only four ounces! The entire assembly, including high-strength steel hubs and retaining rings, weighs just 3½ pounds. It's the lightest, most compact flexible gear coupling you can buy. Another outstanding "first" from Sier-Bath, pioneer producer of flangeless, one-piece flexible gear couplings.

The NYFLEX coupling gives you several innovations in design and performance. It never needs lubrication . . . Takes almost 5° misalignment . . . Can be run equally well in either horizontal or vertical installations . . . Operating temperatures may be as high as 150°F. . Wide range of horsepower capacities and shaft speeds to 5000 rpm. And it's priced as low as *half the cost* of comparable all-steel couplings! Ten bore sizes available NOW from stock.

Bulletin N-1 gives the complete story of the new Sier-Bath Nyflex coupling. It's yours for the asking.

Sier-Bath

Founded 1905 Member A.G.M.A.

GEAR AND PUMP COMPANY, INC.
9243 Hudson Blvd., North Bergen, N. J.

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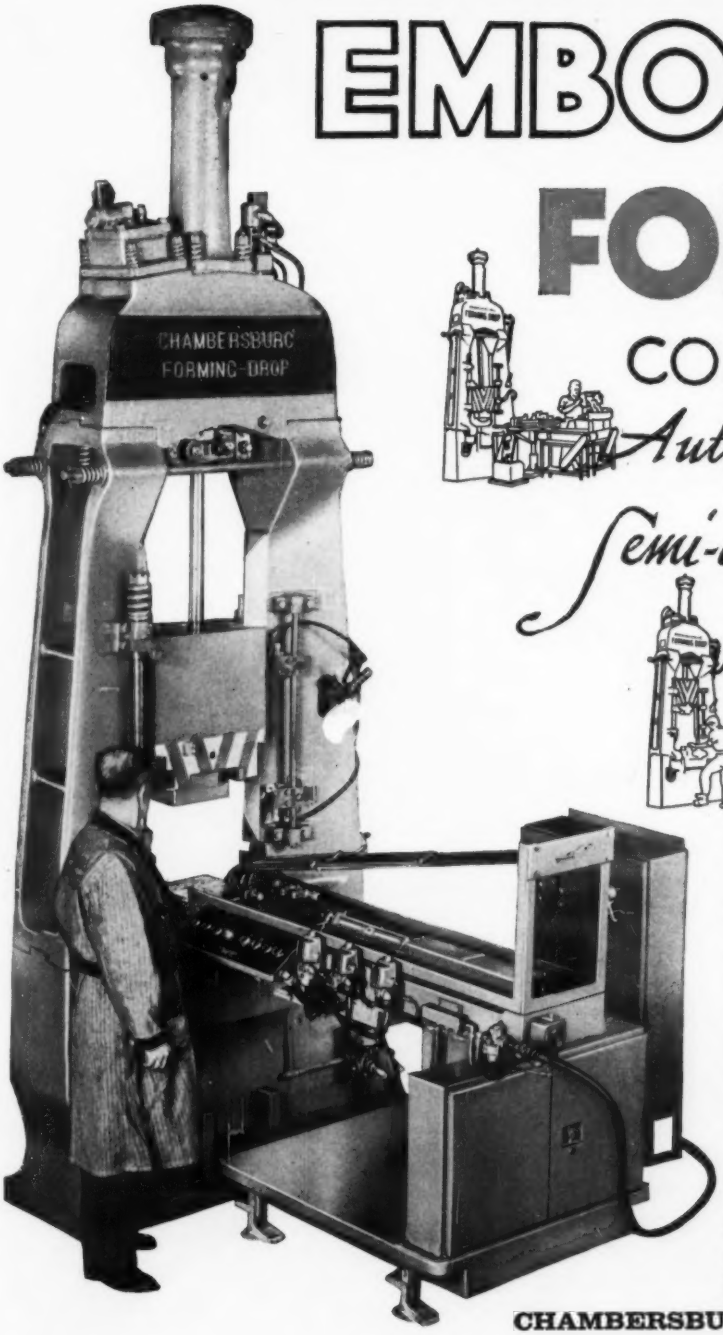
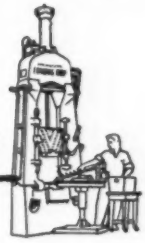


Automatically

Semi-automatically



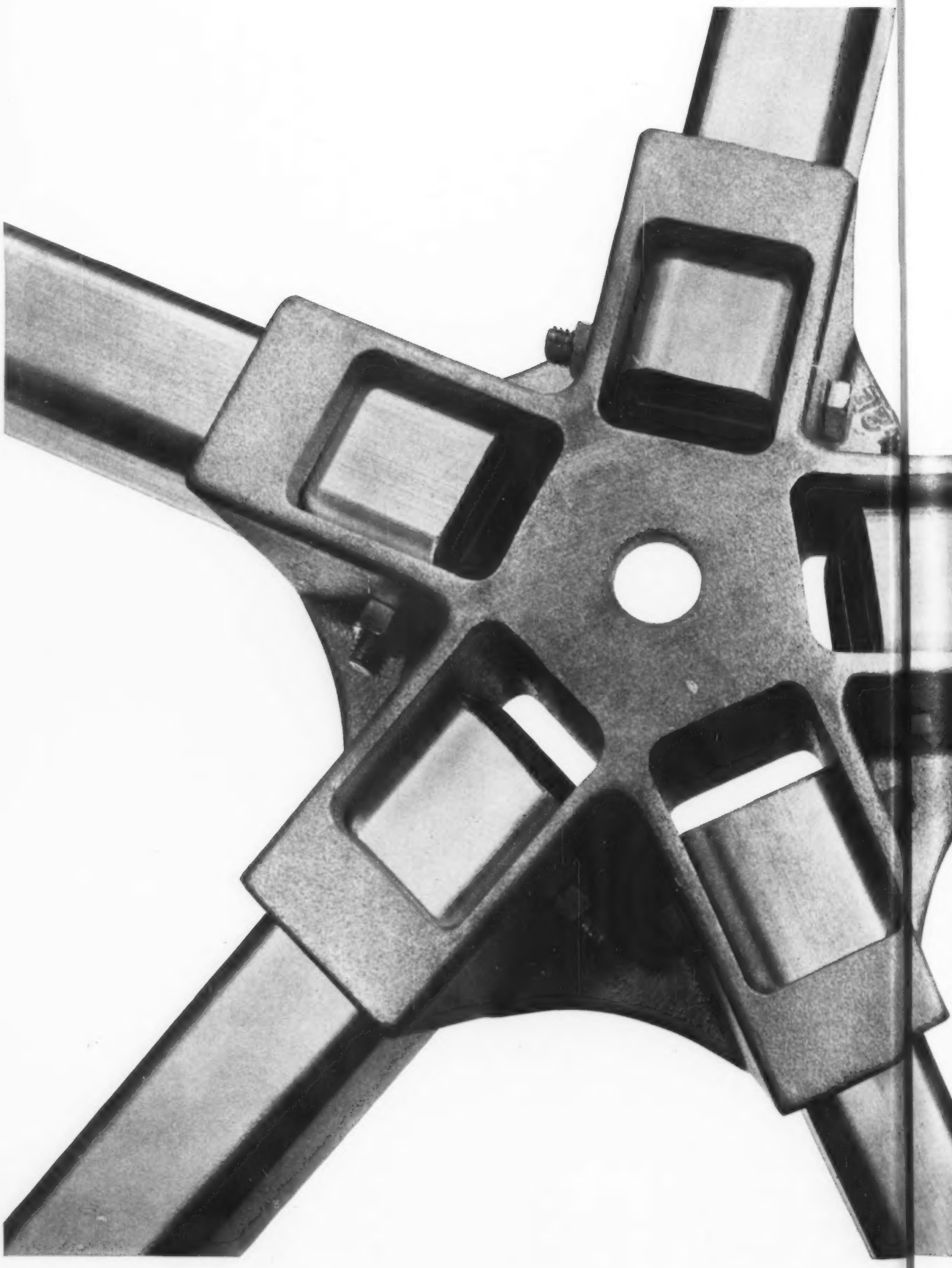
Manually

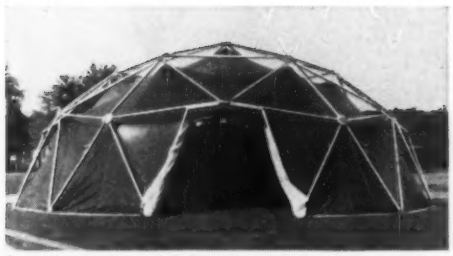
The new Chambersburg Forming Drop meets the demand for an accurate, high production hammer for coining, embossing, forming and cold striking. The impact blow, which minimizes springback, can be precisely adjusted to suit particular job requirements. Electric controls permit the use of versatile feed devices increasing operator safety and efficiency.

A Chambersburg representative will be glad to show you a film depicting this new production method. Phone or write for further details.

CHAMBERSBURG ENGINEERING COMPANY
CHAMBERSBURG, PA.

CHAMBERSBURG
FORMING DROP





One of the many Q-E-D* geodesic-type dome shelters built for the U. S. Marine Corps by Magnesium Products of Milwaukee, Inc.

The marines go modern . . . quartering themselves and their equipment in portable, simple-to-erect geodesic-type dome shelters like the one shown above. It was designed and engineered by Magnesium Products of Milwaukee, Inc. And strong, lightweight Flynn aluminum extrusions were used to form the framework.

Geodesic shelters—made by Flynn's customer in diameters of 24, 30, 36, 42, AND 57 feet—have to "rough" it. They have to be maneuverable. That's why extruded aluminum is used.

Flynn extrusions form framework for sturdy, mobile Marine Corps shelters

It's tough and long-lasting as well as light and handy to work with. It makes assembly fast and simple. Also, aluminum parts are easy and economical to ship.

Whether your product is for the battlefield or the industrial field, it'll pay you to investigate all the possibilities and advantages of working with Flynn. Flynn has the know-how and experience to turn out quality aluminum parts—in large or small quantities—to your exact specifications. You can order custom styles, or choose from a wide variety of stock profiles and alloys. And you can rely on Flynn for fast, as-promised deliveries.

Write today for ideas relating to your own product . . . free from Flynn of course.

FLYNN
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Aluminum Division

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*Quick-erect dome

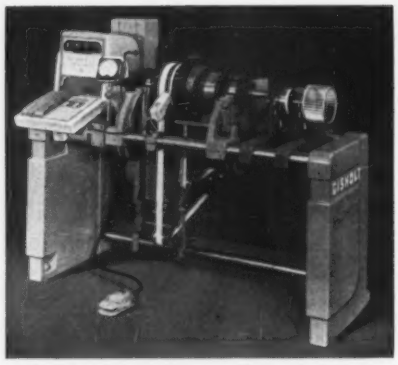
A good buyer doesn't buy by ear...

Static and dynamic balancing is a critical quality-control operation. Balancing tolerances in rotating parts must be held to eliminate destructive vibrations and assure long, trouble-free performance in the field. If a balancer fails to provide these accuracy assurances, it's a bad investment at any price.

Words alone are not enough, especially when it comes to buying a balancer. Instead of claims, demand to see proof of the machine's ability to meet the close tolerances your work requires. Thoroughly test and compare competitive machines—on your own work—*before* you buy!

Gisholt gives you proof before you buy. We invite you to see your work balanced on any of the Gisholt Balancers...and to watch them go through a series of scientific balancing tests in our plant...to prove that your tolerances will be met economically and efficiently *before* you buy!

Free book on balancer testing. The tests that Gisholt will conduct to verify accuracy and production claims are covered in a new booklet, "Performance Tests for Balancing Machines." It's designed to help you determine your balancing equipment needs and to simplify the job of comparing competitive machines. Remember, no *reliable* supplier of balancing machines will refuse to cooperate in these tests and you will have complete assurance that your requirements will be met—before you buy! Ask your Gisholt Representative or write us for your free copy.



The Gisholt 31S Balancer shown here accommodates an extremely wide range of workpiece weights and diameters...is ideal for production or job-lot operations. Capable of accurately measuring and locating vibratory movements as small as .000025" in one or two correction planes, direct reading amount meter provides quick answers in terms of correction method most suitable to work at hand—for added savings.

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

Investigate Gisholt's Extended Payment and Leasing Plans

Turret Lathes • Automatic Lathes • Balancers • Superfinishers • Threading Lathes • *Factory-Rebuilt Machines with New-Machine Guarantee*

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SPRING STEEL QUALITY

Control of steel purity. The SANDVIK laboratories carry out more than 200,000 chemical analyses a year.

Research microscope for up to 2,000X enlargements. This microscope is also used for the study of structures, control of heat treatments, macrophotography etc.

At Sandvik, the latest scientific research and quality control techniques constantly improve and protect spring steel quality.

This is part of the reason why Sandvik steels have the special physical stamina to give consistent performance in such critical applications as flapper valves, instrument springs, shock absorbers, surgical instruments, unbreakable watch mainsprings, piston ring segments and expanders, etc.

Sandvik stocks a wide variety of grades and sizes of cold rolled specialty strip steels. For information on leading types, send for this free brochure.

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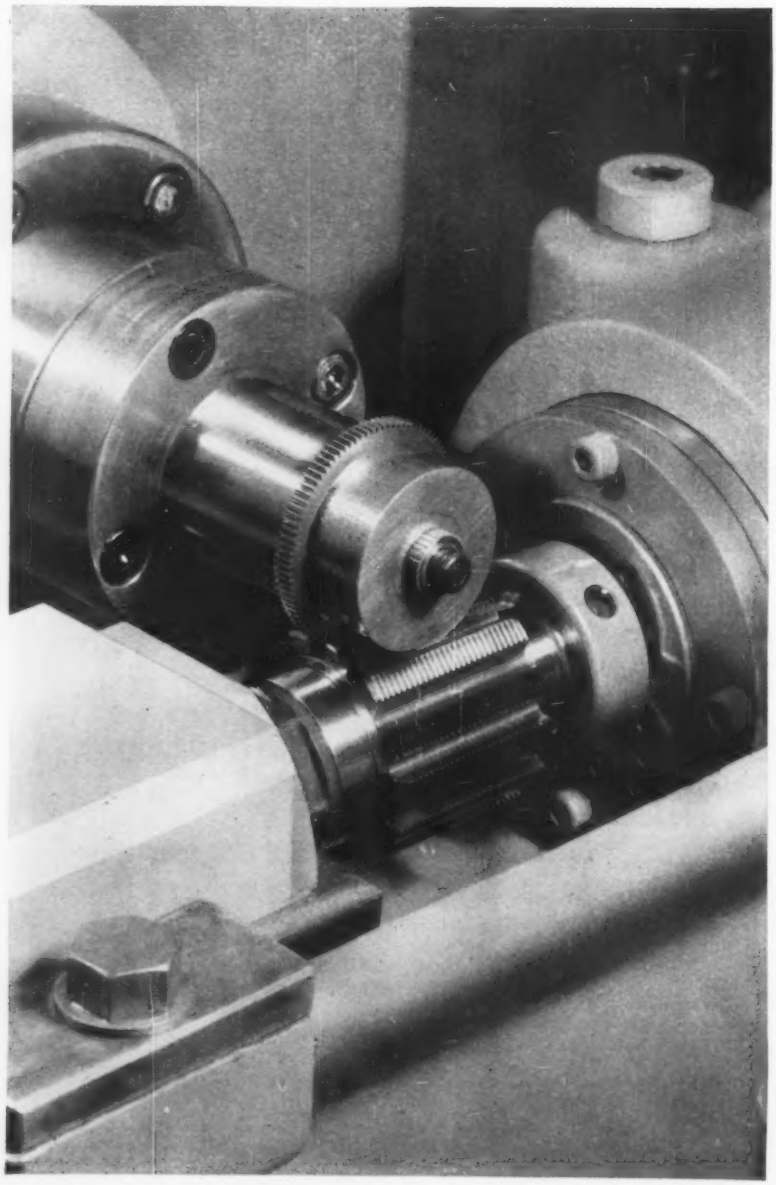
Works: Sandviken, Sweden

SS-191

New method of producing

AGMA Precision



Selection and segregation no longer necessary to insure precision-matched spur gear sets

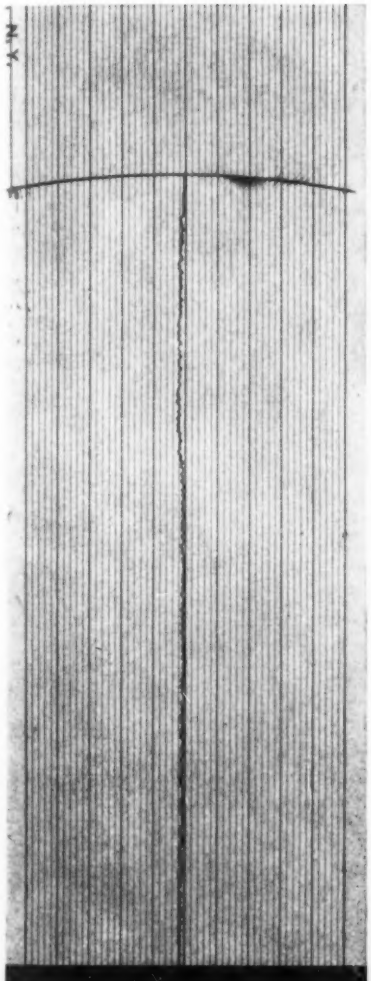
Selection and segregation — the process of producing more gears than you need in order to select a few that are within Precision Class 2 or Class 3 tolerances — is no longer necessary. And, these jobs at PIC Design Corporation, East Rockaway, L.I., New York, prove it.

In pioneering "Ultracision" accuracy for the missiles industry, Barber-Colman Company developed extensive machining and testing techniques now embodied in a new, low-cost hobbing machine — the No. 2½-4. For mass production of easily machinable parts which do not require such a high degree of accuracy, a high-speed version of this machine is available with a maximum hob speed of 2400 rpm.

Completely new hobbing machine

New concepts have been introduced into the Barber-Colman No. 2½-4 to bring you exceptional accuracy at a nominal cost. The No. 2½-4 is guaranteed to index accurately within 20 seconds of arc. This means that nonadjacent spacing error on a 2″ dia. gear would be only .0001″ due solely to the indexing error of the machine. When rigid tooling . . . accurate blanks . . . care in mounting the hob and work . . . Class AA hobs . . . and accurate hob-sharpening methods are used, it should be possible to hob AGMA Precision Class 2 and Class 3 gears without selection and segregation. Scrap and inspection time are reduced. And, in many

Class 3 Gears



Each line on tape represents .0001". This Precision Class 3 gear was obtained with only slightly more care than required for Class 2 gears.

cases, deeper savings can result from the elimination of finishing operations.

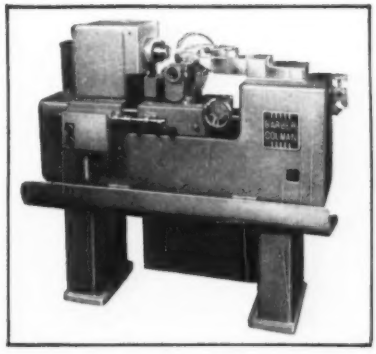
The accompanying PIC "true blue" gear tape shows the inspection record of a Precision Class 3 gear. On the production run, all gears had a total composite error of less than .0004". The gears have 96 teeth of 64 DP. The tape is made on a variable center-distance checking machine with a motor-driven master gear which rolls under preset pressure with the cut gear. After the work spindle adapter and the hob were trued within .0001", no further adjustments were necessary for hobbing gears of this accuracy.

The No. 2½-4 accommodates 3" dia. hobs, permitting maximum number of flutes for cutting accurate, smooth tooth profiles. Maximum work diameter is 2½" and length of cut is 2¼" — for steel gears as coarse as 30 pitch or brass up to 20 pitch.

PIC pursues accuracy in every corner of production

As you examine the results being achieved with the No. 2½-4 by PIC Design Corporation, you will see that in their pursuit of predictability and precision, no stone is left unturned.

Bores of Precision Class 2 and 3 gear blanks are machined to +.0002", -.0000" for size and roundness. Before turning, blanks are mounted on arbors the same size as the bores, with a .0002" taper. They are inspected for face wobble and must run true within .0002" per inch of diameter before the OD's are turned to a concentricity tolerance of .0001". This operation is checked at two points, 180 deg. apart.



In hobbing, the arbors are held in a floating adapter which permits fine adjustment to desired concentricity. PIC uses only Barber-Colman Class A or AA hobs, trued on the machine to less than .0001" runout.

Evaluate your gear processing and costs

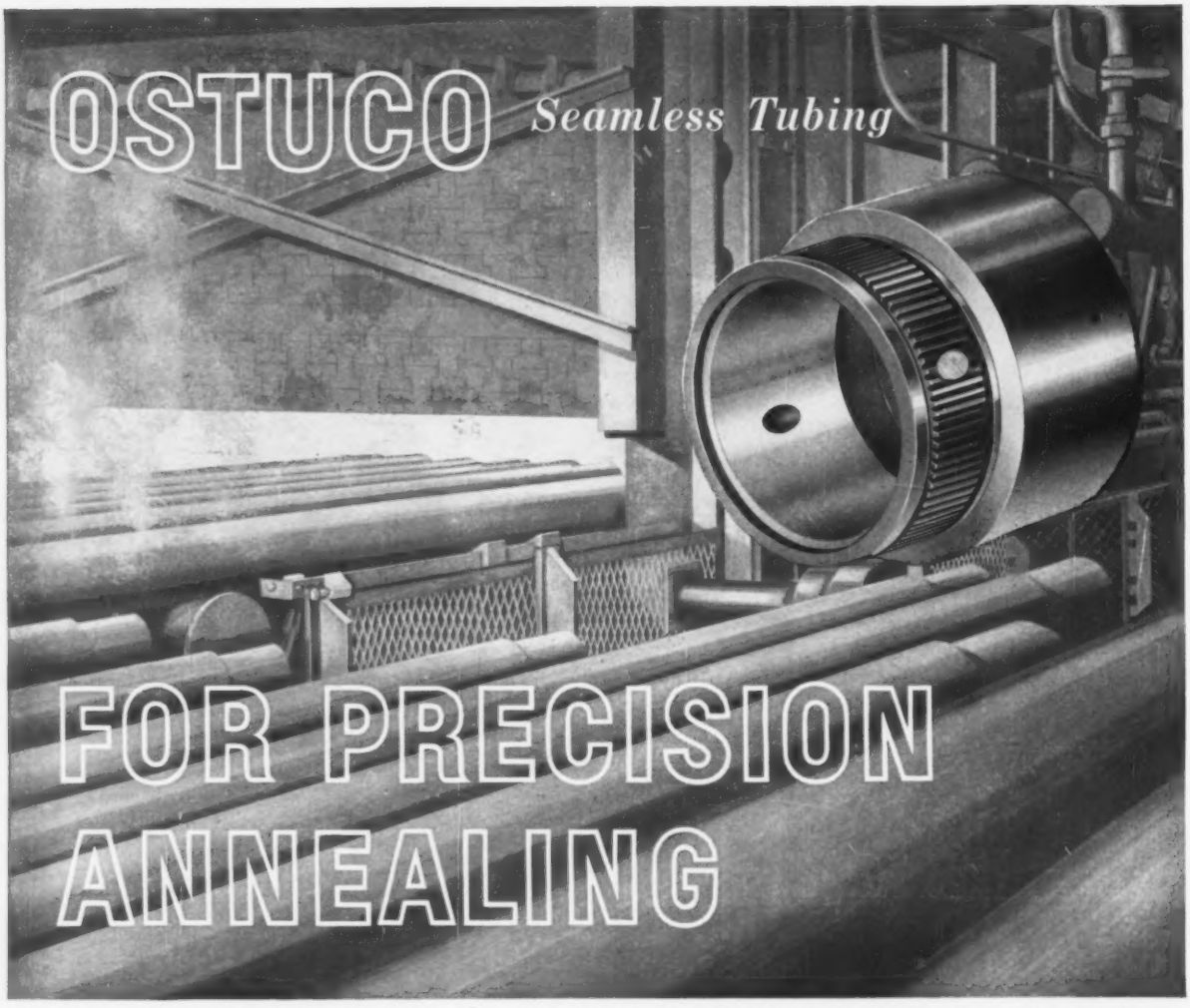
If you have the problem of producing precision fine-pitch gears at a profit or want to improve your product by increasing gear accuracy, a Barber-Colman process analyst will help you evaluate methods, tooling, and cost improvements. Phone your B-C representative or the factory — WO 8-6833.

Barber-Colman Company

BARBER COLMAN

510 Loomis Street, Rockford, Illinois

Automatic Transmission Manufacturer Specifies



Annealing furnace at the Shelby mill. Ostuco tubing can be bright or soft annealed, stress relieved, normalized or heat treated.

"As a leading producer of quality transmission components, we can't leave anything to chance. Our design requirements, materials specifications and manufacturing processes are under the most stringent quality control standards. And we demand as much of our vendors.

"One sure way we have found to eliminate the unpredictable is to specify Ostuco Seamless Tubing. We know from experience we can rely on the precision annealing and unvarying quality of Ostuco tubing that slashes reject rates, helps us produce parts in quantity for profit . . ."

If you want to eliminate the unpredictable in your own plant, then it's time you called your local Ohio Seamless representative. He's listed in the Yellow Pages. Or contact the plant at *Shelby, Ohio —Birthplace of the Seamless Steel Tube Industry in America.*

AA-9004

OSTUCO SHELBY OHIO — OSTUCO TUBING

OHIO SEAMLESS TUBE DIVISION

of Copperweld Steel Company • SHELBY, OHIO

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Seamless and Electric Resistance Welded Steel Tubing • Fabricating and Forging

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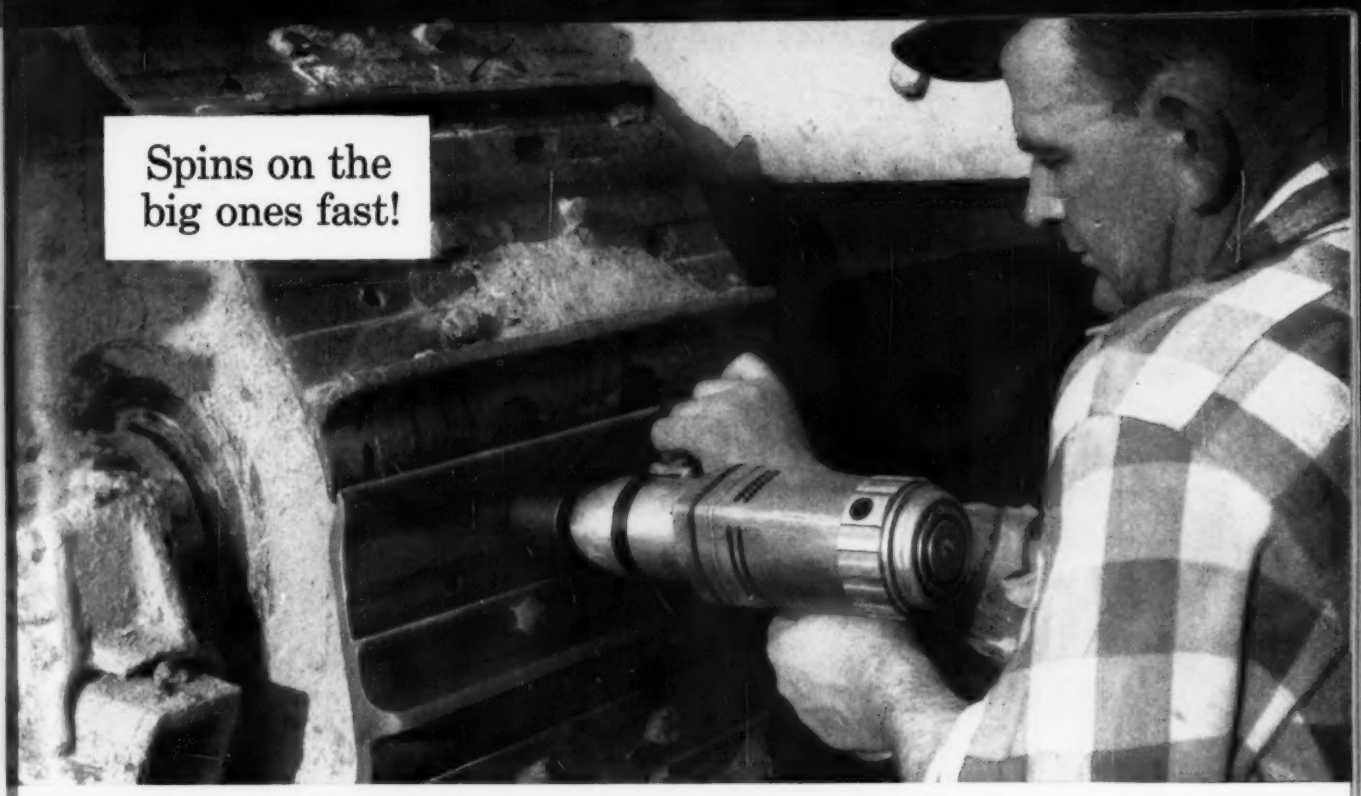
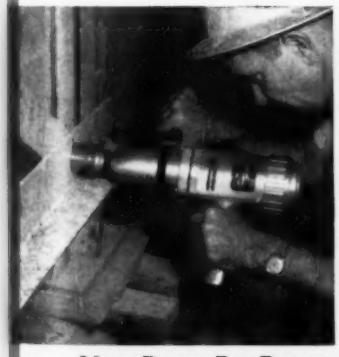


B&D 300 Impact Wrench slashes equipment down-time!



MORE POWER PER POUND: this lightweight (only 13 lbs.) tool really packs a powerful punch!

LONGER LIFE! Torture tests show it has higher performance, cooler running, longer life than competition.

EASIER HANDLING! Pistol grip positioned to eliminate nose or tail heaviness. No starting torque twist. All-position auxiliary handle.

NO. 100 IMPACT WRENCH: the rugged wrench for smaller applications; hits maximum torque in just six seconds!

See for yourself! Mail coupon today for free demonstration.

A 3c stamp will bring you a demonstration of the tool that slashes tractor pad replacement time from hours to minutes—takes the back-break out of a tough job! Users report it's a cinch—just burn off the old head, punch the bolt through. Then, insert new bolt and run it up—*fast*—with the new B&D No. 300 Impact Wrench!

Packing a minimum of 300 ft. lbs. of torque and capable of handling bolts as large as 1¼" effortlessly, this new B&D power-built tool has thousands of uses. Use it for structural steel sub-assembly and final assembly; to remove heavy, dirt-encrusted truck lugs. Look about you. Chances are you'll find many uses for this tough, versatile tool! THE BLACK & DECKER MFG. CO., Dept. 0905, Towson 4, Md. (In Canada: Brockville, Ontario.)

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Quality Electric Tools—Power-Built to set the pace

MAIL COUPON FOR FREE DEMONSTRATION

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☐ Please arrange a demonstration of your new No. 300 Impact Wrench.

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Company.....

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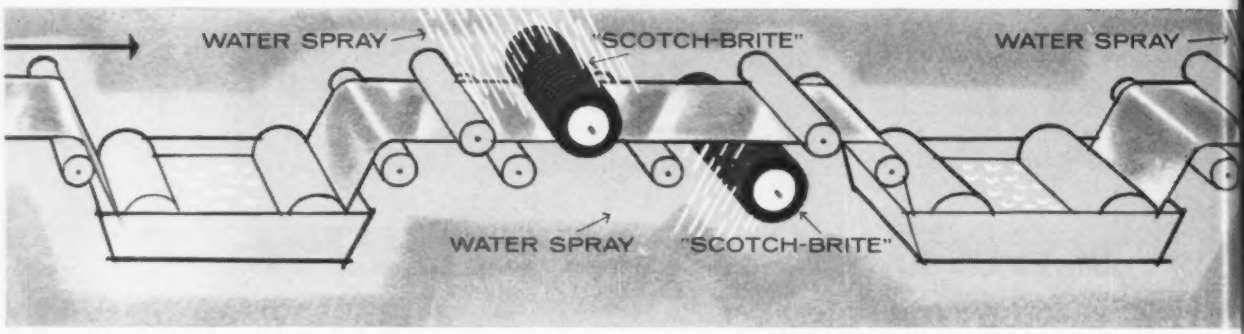
NEW from 3M...

REG. U.S. PAT. OFF.

"SCOTCH-BRITE" BRAND Finishing Material



Upgrades finishes at low cost—

"SCOTCH-BRITE" Brand Finishing Material is a newly developed Nylon web, impregnated with microscopic working materials—*completely unlike any other finishing material you have ever seen.* It is lightweight, flexible, and available in a range of sizes in sheet, roll and section forms. It can be used in any metal cleaning or finishing operation to obtain finer end finishes with greater surface uniformity. (Another similar product in the "SCOTCH-BRITE" family, introduced in February 1958, has already revolutionized floor maintenance through its ability to *slash costs.*)

STEEL PICKLING: Diagram shows how a wide loading of "SCOTCH-BRITE" replaces ordinary scrubbing brushes. Its superior action cleans more effectively and breaks up scale to speed the pickling process; makes possible a *far better* finish with a shorter time cycle or less acid.

FINISHING LINES: Used in production operations for final finishing on any metal, "SCOTCH-BRITE" can upgrade final product quality and appearance by providing a perfectly uniform satin-type finish—at *very low cost.* It enables fabricators to match perfectly a mill finish applied with "SCOTCH-BRITE", or to apply their own satin finish over any mill-supplied finish. And "SCOTCH-BRITE" finishes cool, never discolors, *never distorts.*

You are equipped to use "SCOTCH-BRITE" now! Material is approximately ¼" thick, may be purchased ready-cut or in sheet form for wide-shaft and other existing equipment applications. Five to eight sections

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on any metal

of material make up one inch of wheel width. Because of its lightness, only ¼ hp per inch of wheel width is needed to drive. Greatest effectiveness is achieved with very light pressure—the material does the work.

Ask for
FREE DEMONSTRATION

New "SCOTCH-BRITE" Material is so totally different from any other finishing material, and the results are also so different, that the only way to really judge it is by seeing it in action on your own line. We'll be glad to arrange a demonstration at your convenience. Just clip and mail the coupon.

"SCOTCH-BRITE" IS A REGISTERED TRADEMARK OF 3M CO., ST. PAUL 6, MINN. EXPORT: 99 PARK AVE., NEW YORK 16. CANADA: LONDON, ONTARIO.

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☐ Please call to arrange a demonstration of your new "SCOTCH-BRITE" Finishing Material.

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Progress Report on

TWO NEW METHODS OF TUBULAR COMPONENTS PRODUCTION

Special metal-working techniques are being used by the Tapco Group to produce tubular members with distinct advantages for hundreds of aircraft, missile, industrial and consumer-product applications. Two of these techniques, Metal Gathering and Flotrusion*, offer important solutions to designers and engineers with the problem of tubular parts production.

METAL GATHERING

Using the Metal Gathering process, a portion of a metal tube is heated in a resistance unit, then "gathered" into a forged lump or mass at either or both ends of the tube. The heated end-mass can then be immediately extruded or forged to any desired rough configuration. After gathering or forging, any machining operation needed to finish the end is readily done right in the shops of the Tapco Group. Examples of tubing end-features produced by this process are illustrated in Figure 1.

Metal Gathering by the Tapco method offers several advantages: one-piece parts free from welds, brazing, or mechanical assembly; minimum machining for end features; no machining of tube interior to reduce wall thickness; better grain flow for greater strength and fatigue resistance; uniform heat-treatment because the whole part is formed from tubing; heavy sections are integral with tubing; no excess metal required, hence material cost is less; a rapid process for reproduction once tooling is established.

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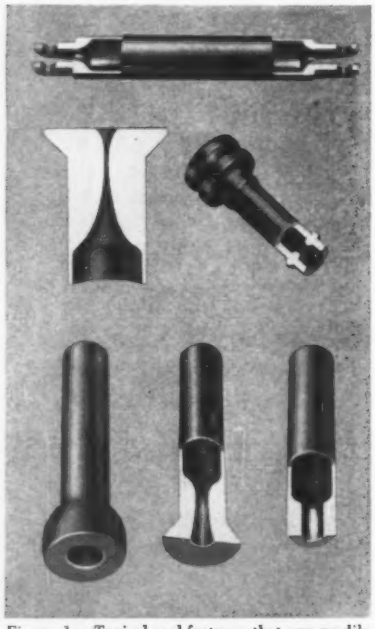

Figure 1—Typical end-features that are readily produced in tubing by the Tapco Group using the versatile, cost-saving Metal Gathering process.

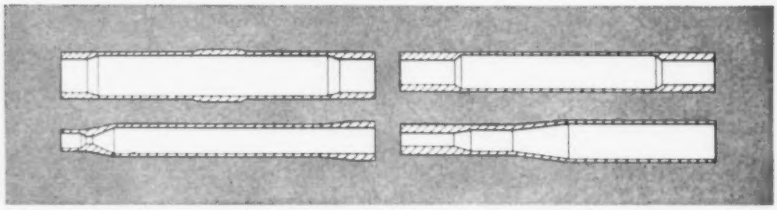

Figure 2—Flotrusion produces any desired variation in metal tubing, including those illustrated here.

The Tapco Metal Gathering process is readily applied to any metal, including steel, stainless steel, aluminum, titanium, and zirconium.

Designs are almost unlimited in size, complexity, and features. A broad range of tubing lengths, diameters, and wall thicknesses can be handled by the Metal Gathering process. Close tolerances can be supplied; grinding, polishing, or honing can be vastly reduced, and in some cases eliminated. One-piece parts replace multi-part assemblies. The process can also be used at various points along the length of the tubing.

FLOTRUSION

The Tapco Flotrusion process permits cold-drawing of tubing into various internal and external thicknesses, configurations, sizes, and shapes, shown in Figure 2. The process was developed to permit high-production rates of parts normally employing high-cost machining or polishing. Flotrusion can also be combined with the Tapco Metal Gathering process to produce an almost limitless variety of end-features, wall-thickness variations, and other features in tubing.

Tapco Flotrusion offers these advantages:

Heavy wall sections can be developed at one or both ends of cylindrical forms to provide for bearings, threads, or weldments,

Uniform wall thickness can be provided with smaller or larger diameters on the tube,

Surface finishes of excellent quality are standard, without expensive machining or polishing,

Burring and honing are not required,

Grain structure is improved, and additional heat-treatment can often be eliminated since cold-working improves tensile strength,

Tubing that has been heat-treated before Flotrusion gains added strength by cold-working,

Non-heat-treatable metals also gain strength by the cold-work effect of Flotrusion,

No excess material is required . . . Flotrusion requires only the exact volume of material that the finished part requires. Material cost is kept down.

All forgeable metals can be processed by Flotrusion . . . alloy and stainless steels, aluminum, titanium, zirconium, and others.

Tube diameters from 0.060" to 10" can be worked on present Flotrusion equipment at Tapco's completely-equipped plant. Lengths to 15 feet have been processed, but longer lengths and larger diameters are within the range of Tapco capabilities and facilities.

The configurations shown will give you ideas of how you can reduce the cost of tubular components by Metal Gathering or Flotrusion or a combination of the two. A 16-page design and data book on both processes will be sent to you on request.

TAPCO GROUP

Thompson Ramo Wooldridge Inc.

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Weirkote will not give in to corrosion invasion because its zinc coat clings tightly to its steel surface year after year. Reason? Zinc and steel are actually integrated by Weirkote's continuous process.

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Whether you're talking profit or product, there's a lot to be said for Weirkote zinc-coated steel. Write today for a free booklet that tells all about it. Weirton Steel Company, **Dept. A-14,** Weirton, West Virginia.

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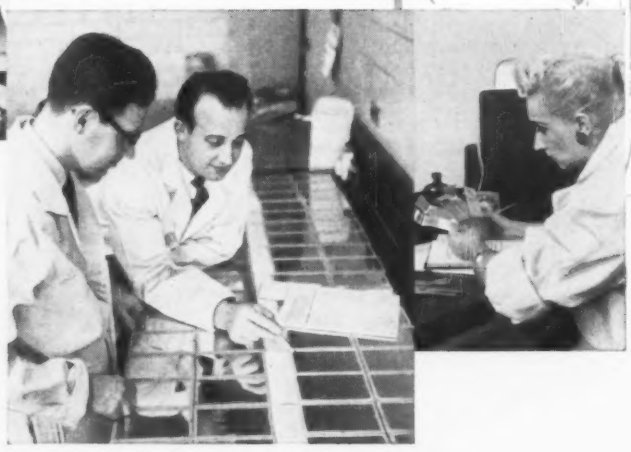

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In addition to these tests others are conducted at an oceanside site and test panels are mounted on cars to travel salt-treated winter streets. Similar panels are subjected to every type of accelerated corrosion test for comparison with other findings.

This counterbalance of testing methods furnishes a wealth of authentic data to guide industry toward better products for better service.

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HEAT EXCHANGER, CONDENSER AND EVAPORATOR — Full Range of Sizes and Analyses

PIPING — Complete Range of Sizes in Schedules 40S, 10S and 5S

AIRCRAFT—Exhaust Stacks, Hydraulic Lines and Duct Tubing

SPECIAL BRIGHT ANNEALED — Up to 4" O.D. — Special Shiny Surface

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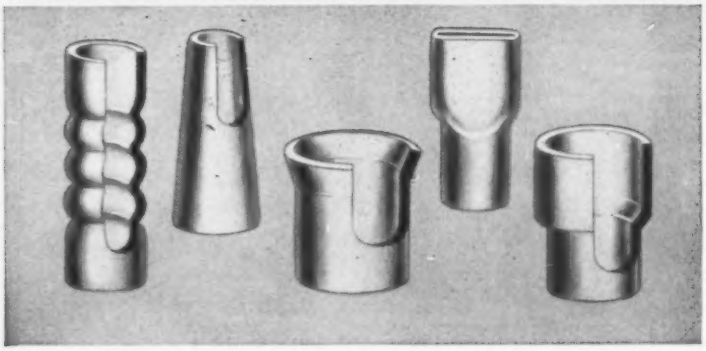

REPUBLIC ELECTRUNITE MECHANICAL TUBING is easily fabricated and formed by the user or through the fabricating and finishing facilities of Republic's Steel and Tubes Division. Round tubing can be furnished flanged, swaged, flattened, fluted, spun, configured, upset, rolled, and otherwise changed in cross-section to meet an endless variety of design requirements. Write for illustrated brochure.

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ELECTRUNITE is quality controlled from ore to finished product. Produced in Republic's own mills to rigid requirements.

Welded by the exclusive ELECTRUNITE process—a continuous electric-weld method that unites the wall under pressure without the addition of foreign or extra metal. Tests prove the weld is as strong or stronger than the original base metal.

Next time you need tubing, whatever the application or problem, call your Republic representative. Or, write direct.

STEEL TUBING AND PIPE

1/32" O.D. TO 40" O.D.

SANITARY — O.D. and I.D. Polished — For Dairy, Food and Fruit Juice Processing

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BEVERAGE — Cut Lengths or 50' Coils

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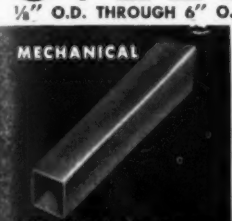
STAINLESS CLAD — Double Wall — Outside Stainless — Inside Carbon

STEEL TUBING

1/8" O.D. THROUGH 6" O.D.



STRUCTURAL—Squares, Rectangles and Special Shapes within periphery of 1" thru 20"

HEAT EXCHANGER AND CONDENSER — To A.S.T.M. — A-214 — To Customer's Special Specifications

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HYDRAULIC LINE — 3/8" O.D. and Larger

REFRIGERATION—Complete Size Range

FABRICATION — All Types of Fabrication Available

SIZE—GAGE RANGE CHART
ROUND TUBING

Outside Diameter of Tube	Wall Thickness (B. W. Gage)	
	Carbon Steels	Stainless Steels
	Mechanical Tubing	Mechanical Tubing
1/4"	.....	16-25
3/8"	18-22	16-25
7/16"	16-22	16-25
1/2"	16-22	14-25
9/16"	14-22	14-25
5/8"	14-22	14-24
11/16"	14-22	14-24
3/4"	9-22	13-24
13/16"	9-22	13-24
7/8"	9-22	12-23
15/16"	9-22	12-23
1"	6-22	11-23
1 1/16"	6-22	11-22
1 1/8"	6-22	11-22
1 3/16"	6-22	11-22
1 1/4"	6-22	11-22
1 5/16"	6-22	11-20
1 3/8"	6-22	11-20
1 7/16"	6-22	11-20
1 1/2"	6-20	10-20
1 5/16"	6-20	10-20
1 5/8"	6-20	10-20
1 11/16"	6-20	10-20
1 3/4"	6-20	10-20
1 7/8"	6-20	10-20
2"	6-20	9-20
2 1/16"	6-20	.....
2 1/8"	6-20	9-20
2 3/16"	6-20	.....
2 1/4"	5-20	9-20
2 3/8"	5-18	8-20
2 1/2"	5-18	8-20
2 5/16"	5-18	.....
2 5/8"	5-18	8-20
2 3/4"	.250"-18	8-20
2 7/8"	.250"-18	8-20
3"	.250"-18	8-20
3 1/4"	.250"-18	8-16
3 1/2"	.250"-18	8-16
4"	.250"-16	8-16
4 1/8"	14-16	.....
4 1/2"	.250"-16	8-16
5"	.250"-16	8-16
5 1/2"	.250"-16	.....
6"	.250"-16	.....

Above are common available sizes. Intermediate sizes also available. Tubes are manufactured by several processes in accordance with the size-gage ratio; therefore not all sizes and gages are readily available in all grades of product. Please contact your nearest Steel and Tubes Division Representative for delivery information on specific size, gage, and grade desired.

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- ☐ Stainless Steel Pipe . . . . Type_____
- ☐ Carbon Steel Tubing . . . . Type_____
- ☐ Please have a Republic Engineer call.

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Firm_____

Address_____

City_____Zone___State_____

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36% more output . . . for
$1800 Dividend Dollars/year.

1A Series Drill
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$1650 Dividend Dollars/year.

000 Series Drill
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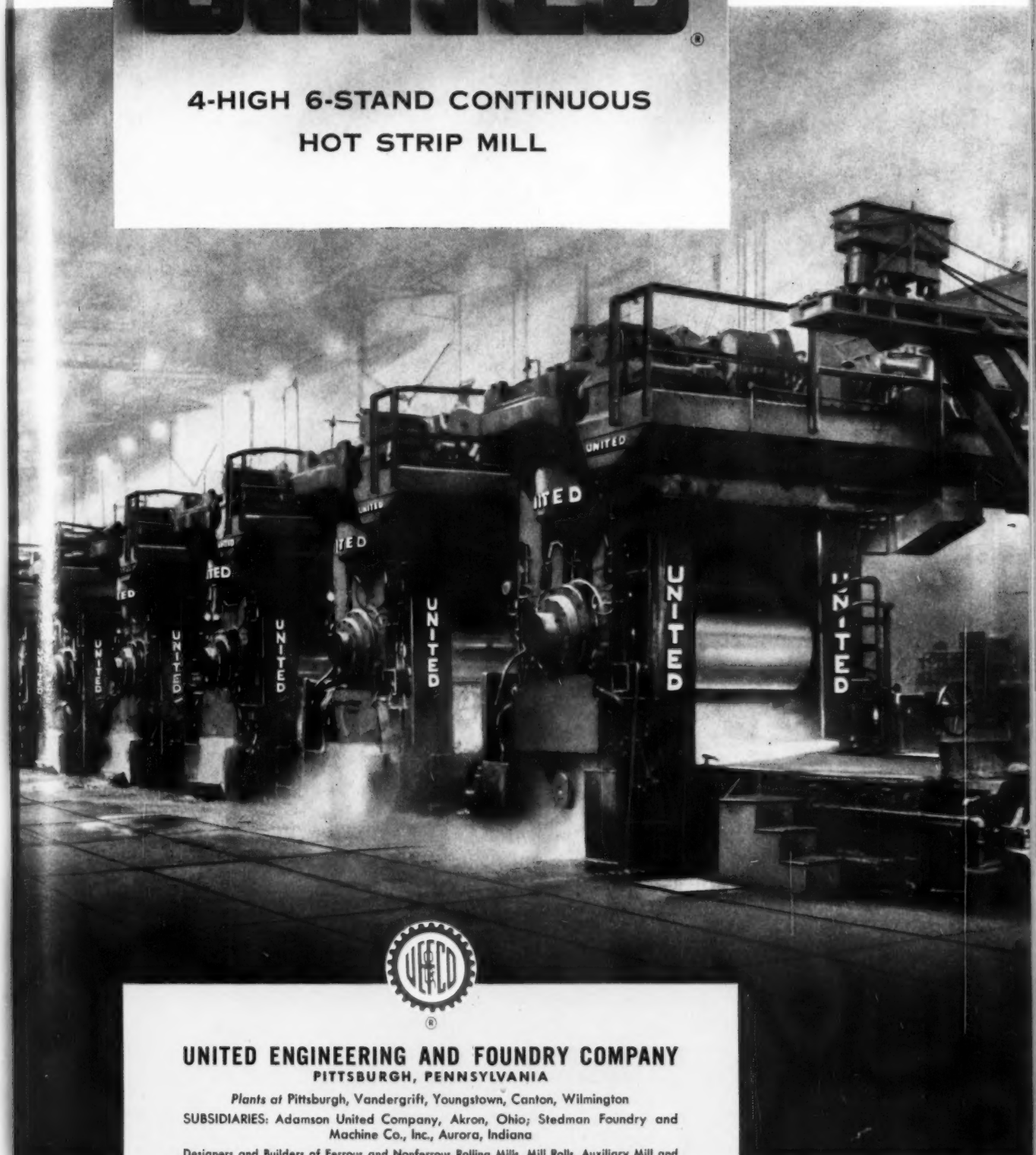

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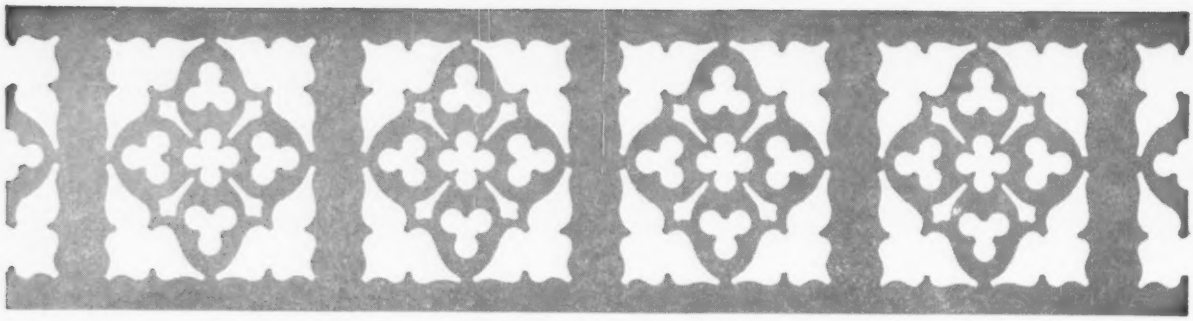
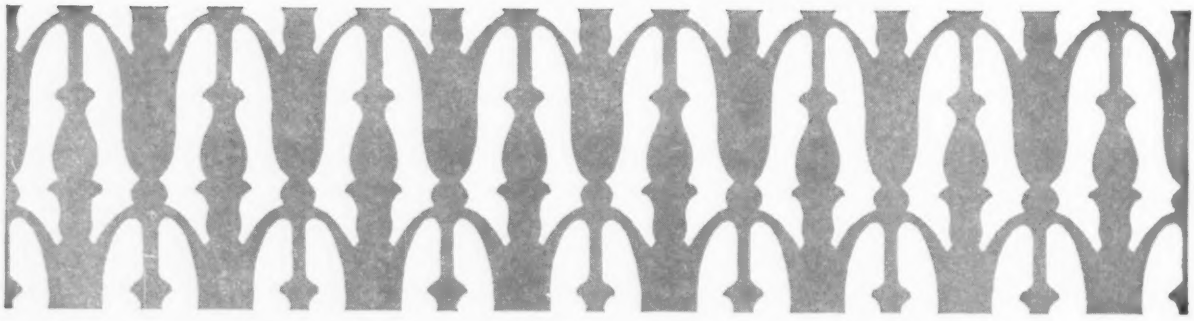


make your design



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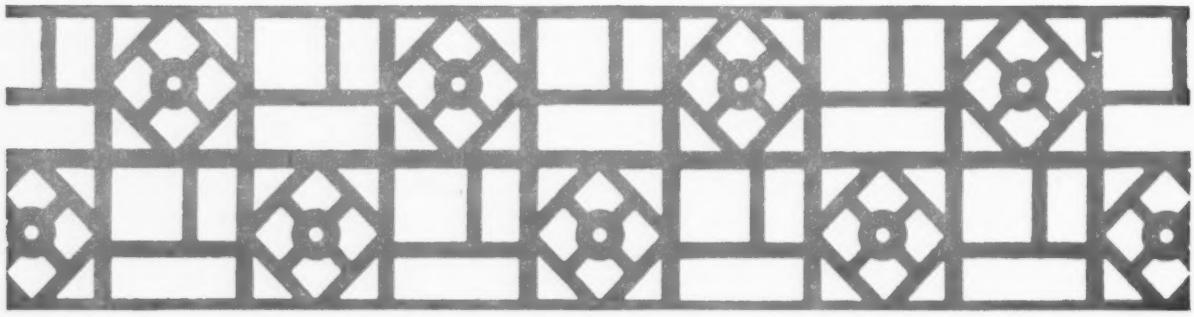

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You may find just the perforated metal to top off your design when you look over the patterns that are exclusively made by Hendrick. These patented patterns are an important part of the Hendrick catalog, which contains more than 100 exclusive designs in all.

Hendrick Perforated Metal is furnished in every available commercially rolled metal. All can be supplied with varying numbers and sizes of perforations, in plain or panel effects.

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MORE MILLIONS OF TROUBLE FREE OPERATIONS

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With this simple solenoid design, there's virtually nothing to go wrong—all trouble-causing bearings, pivots, and flexible jumpers have been eliminated.

• DOUBLE BREAK, SILVER ALLOY CONTACTS
Allen-Bradley silver alloy contacts never require maintenance. They are always in perfect operating condition . . . and remain so until completely worn away.

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The virtually frictionless, straight line vertical motion provides uniform contact pressure at all times—and assures consistent, rapid operation of the contactor.

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All A-B starters are equipped with two permanently accurate and reliable overload relays that protect motors against "burnouts." Three overload relays can be furnished.

BULLETIN 709 STARTERS are made in 9 sizes from Size 0 (at left) up to Size 8.

BULLETIN 709 SIZE 7 with maximum ratings of 300 hp, 220 v; 600 hp, 440-550 v.

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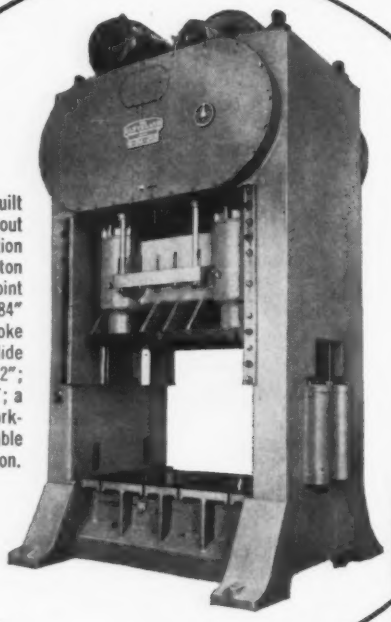
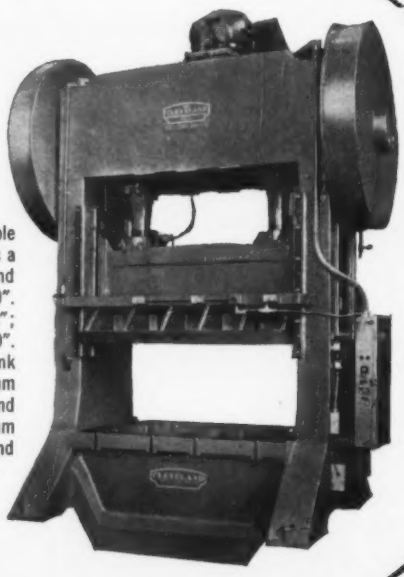


Ruggedly built for day-in, day-out steady production —this 400-ton Cleveland 4-point Press has a 60 x 84" bed area; stroke of slide, 18"; slide adjustment, 12"; shut height, 54"; a dependable work-horse for profitable production.



This 300-ton Straight-Sided Double Crank Press has a 60 x 84" bed area and shut height of 40". Stroke of slide, 18"; Slide adjustment, 10". This double crank press offers maximum accuracy and die life—minimum maintenance and per-part cost.

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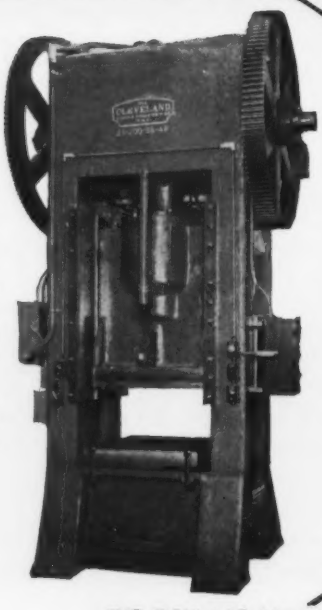
Each of these Cleveland Presses features the patented Cleveland Drum Type Friction Clutch—easily adjusted, uses less power, assures minimum down-time. For lower operating costs, it provides quicker starting and stopping to boost production.

For proven metalworking economy, Cleveland has 12 different types of presses: Inclinable, Horning, Gap, Trimming, Knuckle-Joint, Toggle, Straight Sided Crank, Straight Sided Eccentric, Single Point, Two Point, Four Point, and Four Point Underdrive—each in a wide range of capacities, bed areas, stroke of slide, etc. Investigate how you get BETTER stampings for LESS with a Cleveland Press. AA-9618



This Cleveland 200-ton Straight Sided Single Crank Press is ruggedly built to meet your trimming, blanking, drawing and other press needs. Bed area, 42 x 36"; stroke of slide, 12"; slide adjustment, 6"; shut height, 26".

THE CLEVELAND PUNCH & SHEAR WORKS CO.

Established 1880

Power Presses
Fabricating Tools
Punching Tools & Dies

E. 40th and St. Clair Avenue, Cleveland 14, Ohio

ARISTOLOY

COLD FINISHED BARS

COLD DRAWN BARS
Rounds . . . 1/2" to 3-1/4"
Hexagons . . . 9/16" to 1-11/16"

TURNED BARS
11/16" to 6-1/4" incl.

TURNED AND POLISHED BARS
11/16" to 3-1/2" round

GROUND AND POLISHED BARS
1/2" to 3" rounds

TURNED, GROUND AND POLISHED BARS
11/16" to 4" rounds

BEARING QUALITY • AIRCRAFT • PISTON PIN QUALITY • ELECTRIC FURNACE ALLOY ELECTRIC FURNACE CARBON • ALLOY BASE ALLOY • QUALITY CARBON

LEADED* — Electric Furnace 52100 Electric Furnace Alloy • Electric Furnace Carbon • Alloy Base Alloy • Quality Carbon

STAINLESS—300 Series • 400 Series • 500 Series
*Inland Ledloy License

NEW PRODUCTS & FACILITIES CATALOG

Describes melting, rolling, thermal treating and finishing capacity of Copperweld's Aristoloy Steel Division. Complete product listing for Aristoloy carbon, alloy, stainless, leaded and nitriding steels. Send for your copy today.

ARISTOLOY STEELS

COPPERWELD STEEL COMPANY

ARISTOLOY STEEL DIVISION • 4001 Mahoning Ave., Warren, Ohio • EXPORT: Copperweld Steel International Co., 225 Broadway, New York 7, N.Y.

FRASSE ALUMINUM

helps tell how she's doing!

Ballistic missile success hinges on intelligence obtained in test firings. Tracking data – reporting velocity, direction, altitude, temperature, etc. is vital – when processed, it guides critical design changes.

Heart of the intricate data processing system at Cape Canaveral is a Potter Magnityper – a high speed electronic printer that decodes raw material . . . then stores, collates, interprets and prints at 72 *thousand* characters per minute. Lightweight, non-magnetic aluminum is essential to its efficient operation – that's why the Magnityper is made almost completely of Frasse aluminum.

Frasse ships the required sizes quickly from stock – in the grades that contribute to its ease of fabrication *and* performance. For example, Frasse supplies 2024-T4 bars for *strength* and *machinability*, 5052-H34 sheet for *formability* and *weldability* and "775" tooling plate for *dimensional accuracy* with *no distortion when worked.*

Perhaps these same qualities can increase the efficiency of *your* product – or reduce fabricating costs. It's worth investigating – and a Frasse aluminum specialist will be glad to help. There's no obligation – simply write or call your nearest Frasse office. You'll be glad you did.

Call FRASSE for ALUMINUM

Screw Machine Stock • Bars • Rods • Wire Sheets • Plates • Tubing • Holobar Pipe • Fittings • Valves • Extrusions Tool and Jig Plate

Peter A. Frasse & Co., Inc.

NEW YORK 13, N. Y.	PHILADELPHIA 29, PA.	BUFFALO 7, N. Y.	SYRACUSE 1, N. Y.	HARTFORD 1, CONN.
17 Grand St.	3911 Wissahickon Ave.	P. O. Box K, Sta. B	P. O. Box 1267	P. O. Box 1949
WAlker 5-2200	BAldwin 9-9900	BEdford 4700	HOward 3-8655	JAckson 9-6861

Hard Gear Tooth Honing has completed the transition from an engineering research project to its present operational status in less time than any other major development in the field of modern gear practice. Why? Because Hard Gear Honing satisfies a long recognized need more economically than any other known process.

RED RING HARD GEAR HONING Has Won Wide Acceptance

USERS

- The aircraft industry
- The automotive industry
- Computing machine manufacturers
- Motorcycle industry
- Tractor industry
- Gear manufacturers
- Electric motor (gear head) industry
- Machine tool builders

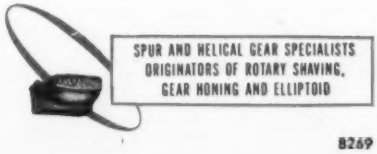
GEARS BEING HONED

- Transmission gears
- Timing gears
- Change gears
- Computor gears
- Main drive gears
- Motorcycle gears

PURPOSE OF HONING

- To remove nicks and burrs
- To improve surface finish
- To improve noisy gears
- To salvage rejects
- To quickly detect errors in prior machining
- To correct minor heat treat distortions

For complete details on Hard Gear Honing, write for Bulletin H-57-2.

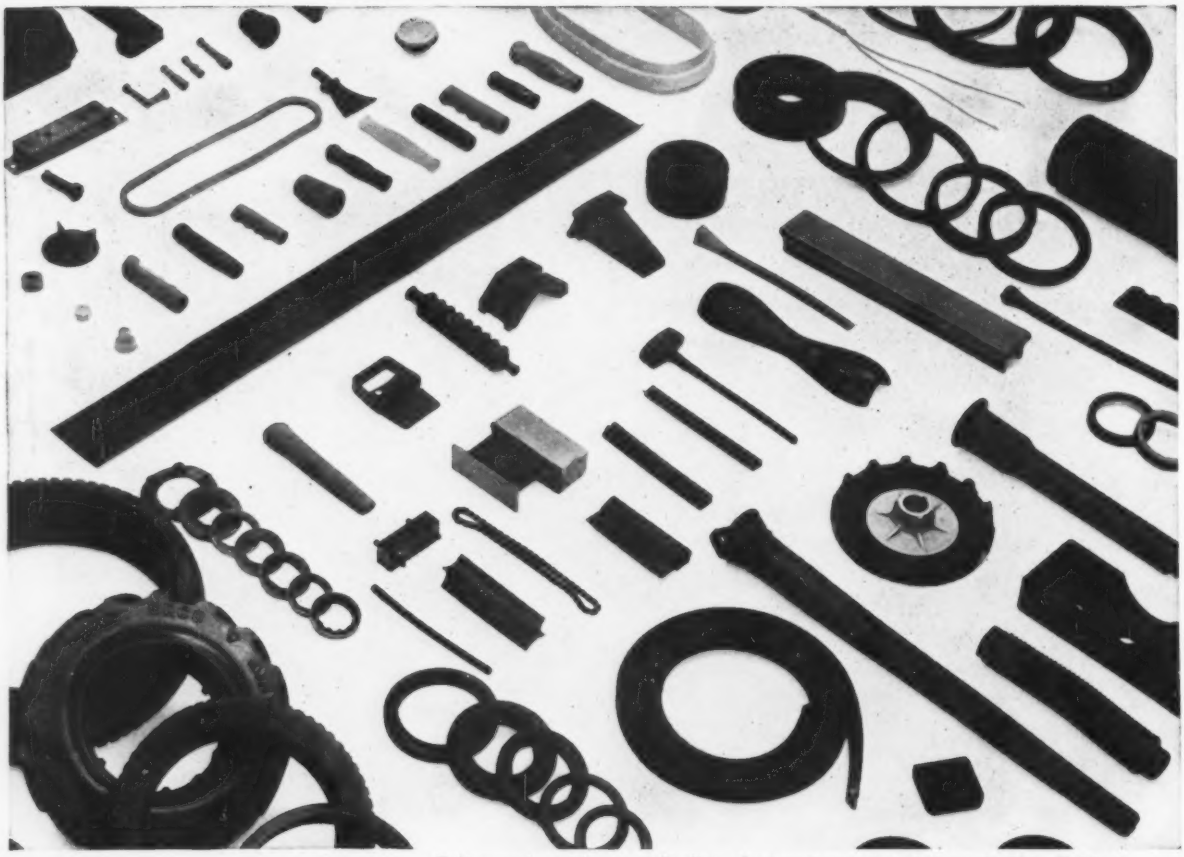


B269

NATIONAL BROACH & MACHINE CO.

5600 ST. JEAN • DETROIT 13, MICHIGAN

WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT



Tailor-made rubber and flexible vinyl parts produced through Ohio Rubber "Customeering" for original equipment in every industry.

How OHIO RUBBER fashions more profitable PARTNERSHIPS

An Ohio Rubber "Customeering" engineer may start with your blueprint, but he begins saving you money *after* he checks your performance requirements—what you need, where and how you'll be using your component part.

Your savings start with his recipe for the material which goes into your part. Only the essential properties required for the better performance of *your* product will be included—you will not be buying properties you don't need.

The ORCO engineer's recommendations for feasible design modifications will further help produce a better part, frequently at big savings to you.

Combined with Ohio Rubber's integrated mold and die service, complete facilities for molding, extruding, and bonding to metal, here's a profitable partnership you may want to consider for your custom-made parts of rubber, synthetic rubber, silicone rubber, polyurethane, or flexible vinyl—one that offers all the advantages of single source control and responsibility.

Suggestion: The more complete story behind Ohio Rubber's long-standing and profitable partnerships with leading original equipment manufacturers is more fully told in ORCO Bulletin 715. Write for your free copy today! 9MP1

ORCO

THE OHIO RUBBER COMPANY

WILLOUGHBY, OHIO

A DIVISION OF THE EAGLE-PICHER COMPANY

Chemical energy provides direct current

Power is furnished by a fuel cell in the Allis-Chalmers Research Laboratories. It points the way to remarkably efficient means of energy conversion in the future.

Unlike the conventional storage battery, the fuel cell converts the chemical energy of gases (at room temperature) directly into direct current. For the future the fuel cell promises a highly efficient source of power.

Fundamental research of this type serves *two* end results at Allis-Chalmers: 1) enables design engineers to make equipment even better; 2) helps every industry achieve new efficiencies and economies.

Research is only one area where A-C helps. Single-source availability of "teamed" equipment, maximum engineering assistance and outstanding service facilities are others. For more information, contact your A-C representative, or write Allis-Chalmers, Milwaukee 1, Wisconsin.

Plan to stay ahead... MODERNIZE!

Products for Industry Electrical Generation, Distribution and Utilization Equipment; Pumps; Mechanical Power Transmission Equipment; Processing Machinery; Motors and Control; Water Conditioning Systems, plus Materials Handling Equipment.

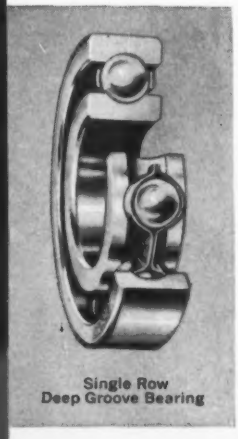
A-C ALLIS-CHALMERS

A-1010-GI

Fuel Cell, being researched by Allis-Chalmers, converts chemical energy of hydrogen, oxygen or other gases into direct current. It operates with minimum maintenance and is unaffected by temperatures.

1959

What's "special" about these standard SKF bearings?



SEE THEM AT THE DESIGN ENGINEERING SHOW MAY 25-26 SKF BOOTH #618

They all have exclusive features. Where else, for example, can you get the 33⅓% higher capacity available in standard SKF spherical roller bearings?

*Or, take the cylindrical roller bearing. This type provides high radial capacity and minimum shaft friction. Controlled shaft end float within the bearing is a natural advantage of this design.

Yet this is SKF's standard cylindrical roller bearing, promptly available in 154 sizes ranging from just under 1" to 6" (bore). In the double row it's 1" to 9.5".

Why not get the complete facts on these "special" but standard (and economical) bearings? For details, call any of the 25 SKF sales offices today. 5923

Spherical, Cylindrical, Ball, and Tyson Tapered Roller Bearings

EVERY TYPE—EVERY USE

SKF®

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

®REG. U. S. PAT. OFF.

An open motor did what no other motor could... in a mudbath

This Super-Seal motor with *Poxeal* insulation and protected bearing was not fouled by mud. An Allis-Chalmers customer, in a frequently flooded area, required a motor that could readily start even after prolonged immersion in mud.

The "dirtiest mud available" was used in conducting the successful tests in the A-C Motor Laboratories.

Motor user requirements like this form the basis for A-C pioneer-leadership in motor development. Motor buyer needs *created the most complete line of integral-horsepower motors in industry*. Induction, dc, wound rotor, synchronous, gear, tube-type and *Synduction* motors, and now *Super-Seal* motors! And, if these lines don't fill your need, A-C engineering excels in special design.

You can benefit from this pioneer-leadership by contacting your A-C representative or distributor. For more information, write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

Super-Seal, Poxeal and Synduction are Allis-Chalmers trademarks.

Plan to stay ahead... MODERNIZE!

ALLIS-CHALMERS

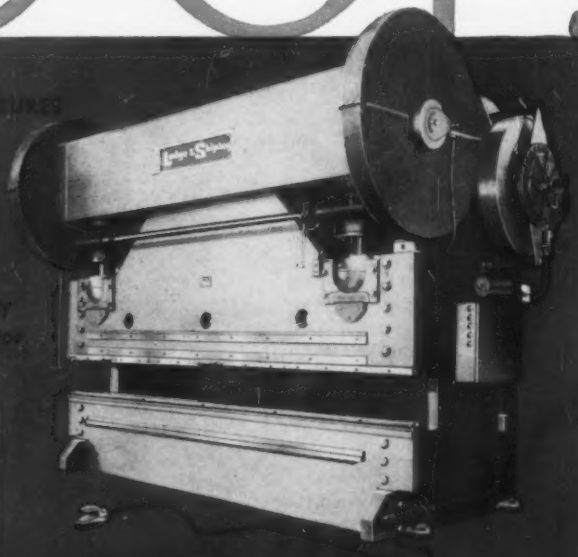
A-1005-G1

PROOF!

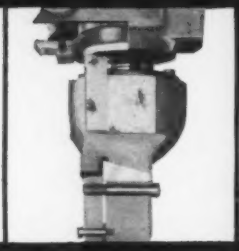
MORE FOR YOUR MONEY IN A LODGE & SHIPLEY PRESS BRAKE

CHECK ALL THESE STANDARD EQUIPMENT FEATURES

- Special combination air clutch and brake
- Exclusive wedge-type ram pressure release
- Motorized micrometer ram adjustment
- Rugged solid steel frame; minimum deflection
- Spur-type drive gearing runs in oil bath
- Housing-supported base for exceptional rigidity
- Remote foot control with "jog-safe-run" selector
- Provisions for ram and base brackets
- Integrally forged alloy eccentric shafts
- Convenient hand and foot controls
- Positive lubrication system
- Full-width die holder for maximum capacity
- V-belt drive and motor base

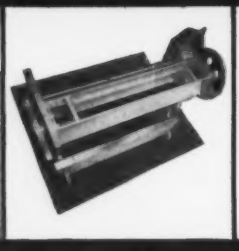


AIR CLUTCH AND BRAKE . . . sensitive, smooth acting and trouble-free — needs no adjustment throughout its life.

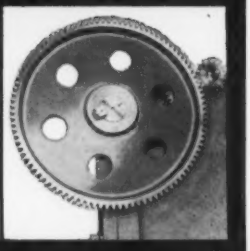


RAM PRESSURE RELEASE . . . exclusive design saves time, dies and machine; operates quickly and easily.

MICRO-RAM ADJUSTMENT . . . push button, direct reading adjustment—includes declutch for adjusting out of parallel.



SOLID STEEL FRAME . . . exceptional rigidity, even at full capacity—two bearings on each eccentric for long life.



EXTRA RUGGED DRIVE . . . spur gearing for efficiency — runs in oil; two-speed drive available at extra cost.

Compare the Lodge & Shipley Press Brake against any other standard equipped brake. You'll pay extra for item after item in the list above. The Lodge & Shipley Press Brake is fully equipped for fast, accurate, versatile and dependable operation. In a few words . . . you *pay no more, get lots more* . . . in a Lodge & Shipley Press Brake.

Want complete details? Write for Condensed Catalog PB-8 or mention capacity requirements for specific literature and data.

SEE OUR CATALOG IN SWEET'S

Lodge & Shipley

THE LODGE & SHIPLEY CO., 3073 COLERAIN AVE., CINCINNATI 25, OHIO

Sustained operating temperatures up to 400° F, as in guided missiles, are death to inferior electrical insulations and laminates. CDF glass-base laminates of Teflon*—the only laminates of their kind approved by the military—can take this punishment steadily.

LATEST HIGH-HEAT INSULATION SYSTEMS NEED CDF GLASS-BASE LAMINATES AND TAPES

Widest available range offers Teflon, epoxy, silicone, mica products for dimensional stability under continuous heat

As components and equipment grow smaller, and heat becomes more difficult to dissipate, CDF high-heat electrical insulations become increasingly important to electronic design. For nowhere else can such a wide range of quality insulations be found under one roof as at CDF.

FOR HIGH-HEAT PRINTED CIRCUITRY, CDF glass-base Di-Clad® laminates of Teflon* and epoxy exhibit best dimensional stability and current-carrying capacity. Constant operating temperatures of 300° F—soldering temperatures to 500°F—are readily met by these specialized CDF Di-Clad laminates.

HIGH-HEAT FLEXIBLE INSULATIONS. CDF offers a wide choice of insulating tapes made of Teflon, silicone varnish, silicone rubber, and Micabond®, with glass-cloth support. CDF tapes may be used either by hand wrapping or on automatic winding machines. Unsupported Teflon in colors available to meet MIL-STD 104.

TEFLON SPAGHETTI TUBING AND OTHER SPECIALTIES. Part of CDF's vast fabrication facilities is devoted to the production of custom parts from Teflon — spaghetti tubing, rods, sheets, and machined parts to rigid specifications.

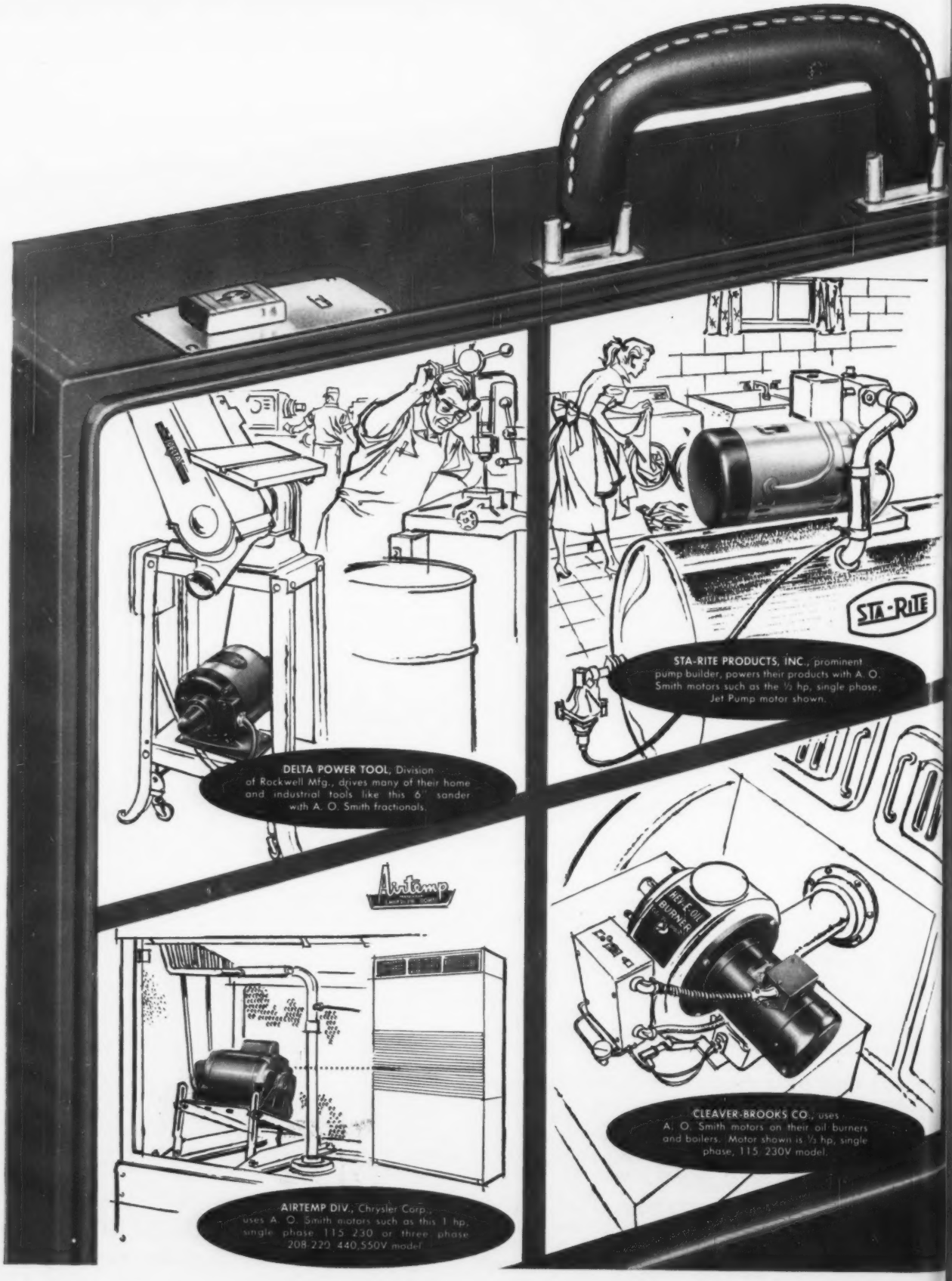
NEW — *cementable* Teflon, bondable to itself and to other materials with commercial adhesives.

SEE SWEET'S Product Design File, Electronics Buyers' Guide, and other directories for the name and phone number of your CDF sales engineer. Then send your print or your problem, and we'll return specific technical data and test samples.

*trademark of DuPont tetrafluoroethylene resin

CDF CONTINENTAL-DIAMOND FIBRE

A SUBSIDIARY OF THE Budd COMPANY • NEWARK 85, DEL.



DELTA POWER TOOL, Division of Rockwell Mfg., drives many of their home and industrial tools like this 6" sander with A. O. Smith fractionals.

STA-RITE PRODUCTS, INC., prominent pump builder, powers their products with A. O. Smith motors such as the ½ hp, single phase, Jet Pump motor shown.

AIRTEMP DIV., Chrysler Corp., uses A. O. Smith motors such as this 1 hp, single phase 115 230 or three phase 208 220 440,550V model.

CLEAVER-BROOKS CO., uses A. O. Smith motors on their oil burners and boilers. Motor shown is ½ hp, single phase, 115 230V model.

YOURS
from the case of
the A. O. Smith
motor man
ROPER HYDRAULICS CO.,
drives their line of pumps with A. O. Smith fractionals ranging from ¼ to 1 hp. Unit shown has ½ hp motor.
ZIP-LIFT
HARNISCHFEGER CORP.,
on their AA-1 Zip-Lift Electric Hoist, uses A. O. Smith motors such as this special ½ hp, three phase, 220 440V model.

These... and 994 "standard" fractionals

Custom-tailored "standards"

Your A. O. Smith motor man can show you over 1000 "standard" fractionals—rigid or resilient base . . . single or polyphase . . . with 56 or 66 NEMA frames . . . horizontal or vertical mounting . . . capacitor-start or polyphase induction . . . or with almost any electrical or mechanical modification needed.

Naturally, like all A. O. Smith motors, the fractionals are quality-built and engineered in every respect. Furthermore, because A. O. Smith "stocks" such a wide variety of fractionals, you can probably get a motor tailored to your exact requirements — needing only minor modifications. That means you not only save board time but you speed delivery!

Why not contact your A. O. Smith motor man now? Write for Bulletin EM-159 or refer to Sweet's Catalog to get the complete story on fractionals as well as A. O. Smith's complete line of integrals and hermetics — ⅓ to 800 hp.

Through research ... *a better way*

A.O.Smith
CORPORATION
ELECTRIC MOTORS
Tipp City, Ohio
A. O. Smith International S. A., Milwaukee 1, Wisconsin, U. S. A.

Furnace at Jones & Laughlin's new Basic Oxygen Steel Making Plant.

In Basic Oxygen Steel Furnaces
HARBISON-WALKER REFRACTORIES
hold U.S. service and production records

From the beginning of the basic oxygen steel-making process in the United States, two unique Harbison-Walker refractories have contributed significantly to its success. H-W 17-56 brick and H-W OXIMIX monolithic refractory were developed by Harbison-Walker Research specifically for this service when conventional basic brick—both hard-fired and chemically-bonded—proved uneconomical for lining oxygen process furnaces.

Their extensive use—much greater than that of other refractories in the expanding basic oxygen process—is attributable to these noteworthy achievements:

- they made tonnage records in the oxygen furnace plants in North America.
- they have consistently and progressively reduced costs per ton of steel.
- their service life records continue to increase.

The Complete Furnace Lining:

- H-W 17-56 is the special tar-bonded basic brick which forms the complete working lining. Continuing research and broadening experience with modifications of H-W 17-56, promises still further progress.
- H-W MAGNESITE brick laid with strong-setting H-W PERIKLASE Bonding Mortar forms the protective lining against the steel shell.
- H-W OXIMIX is the basic ramming mix which forms both the monolithic hearth of the furnace and the intermediate monolith between the H-W 17-56 working lining and the H-W MAGNESITE brick.

Leadership in refractories through constant research

Garber Research Center

HARBISON-WALKER REFRACTORIES COMPANY
AND SUBSIDIARIES
World's Most Complete Refractories Service
GENERAL OFFICES PITTSBURGH 22, PENNSYLVANIA

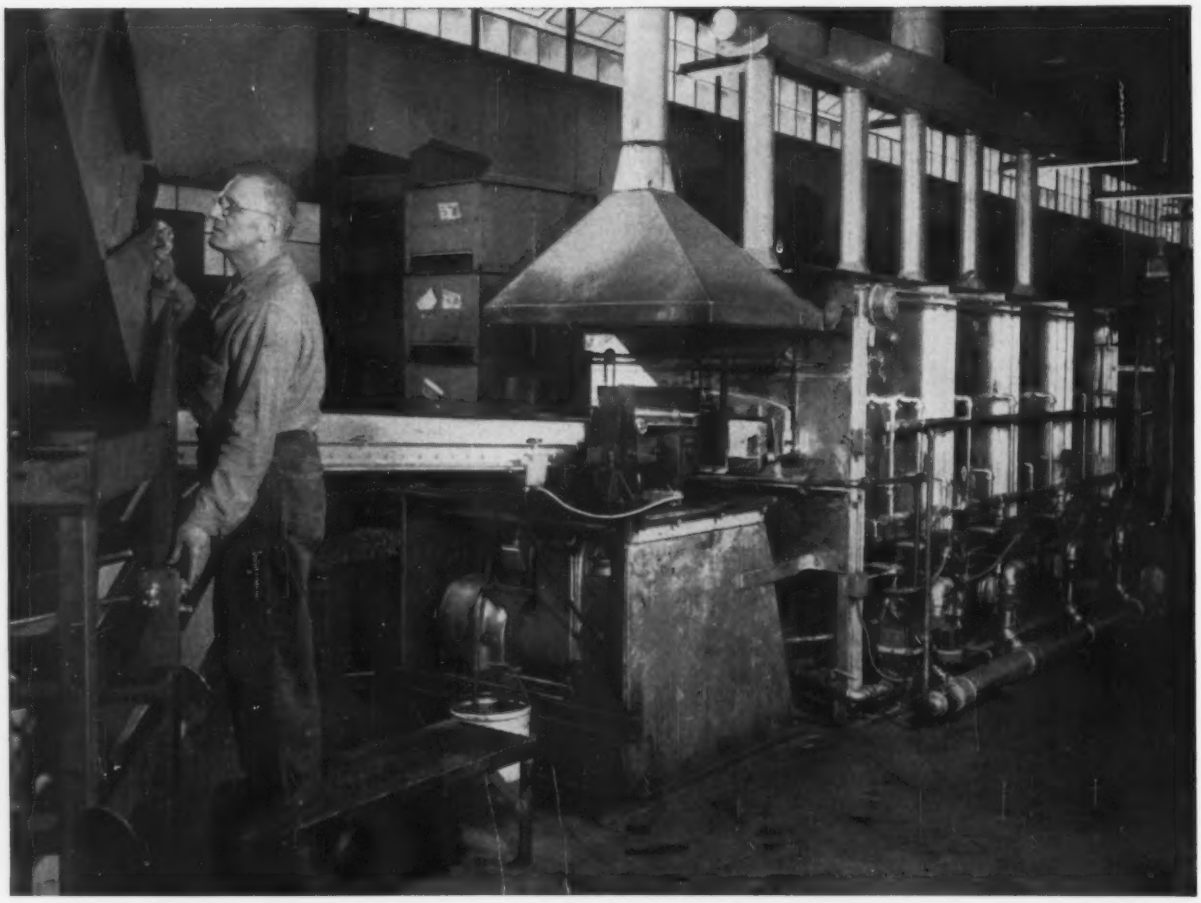
you can smile when its stainless

UNILOY
STAINLESS STEELS

No frowns . . . just smiles when protective trim is made from high strength stainless steel. Its solid quality . . . all the way through . . . and car life beauty will gleam through years of owner pride and satisfaction. Uniloy Stainless Steel provides these qualities—plus ease of fabrication, rolled to your exact specifications.

UNIVERSAL CYCLOPS
STEEL CORPORATION
BRIDGEVILLE, PA.

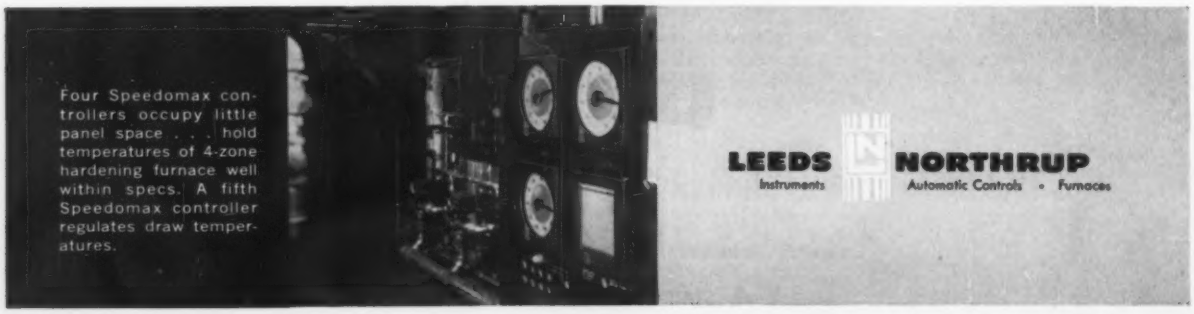
STAINLESS STEELS • TOOL STEELS • HIGH TEMPERATURE METALS



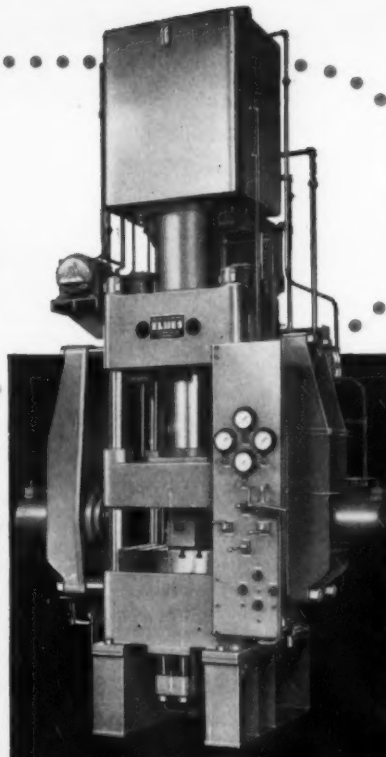
Lamson & Sessions Co.: Operator checks loading of furnace used to harden bolts made of 1038, 1335 and 4140 steel.

Reproducibility of hardening temperatures a problem?

Not at Lamson & Sessions Co.'s Chicago plant, where Speedomax® H controllers are helping to assure reproducibility of hardening specs for nuts and bolts. With competition keen, dependability and reproducibility of processing equipment is a "must". Since installation nearly two years ago, Speedomax H has been controlling temperature of hardening and draw furnaces 5 days/wk, 24 hrs/day. Weekends, furnaces idle at control temperature. Maintenance has been negligible . . . temperature always within specs. Rugged, compact and completely reliable, Speedomax H is providing the same dependable control on numerous heat treat operations . . . is helping produce both process economies and a quality product. *Whatever your heat treating process, it'll pay you to investigate Speedomax H!* For details, contact your nearest L&N office or write 4956 Stenton Ave., Phila. 44, Pa.

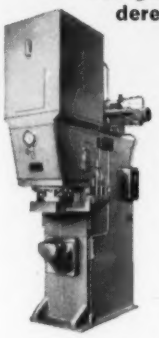

Four Speedomax controllers occupy little panel space . . . hold temperatures of 4-zone hardening furnace well within specs. A fifth Speedomax controller regulates draw temperatures.
LEEDS
Instruments
NORTHRUP
Automatic Controls • Furnaces

Because of what this unique DEVELOPMENT PRESS tells us...

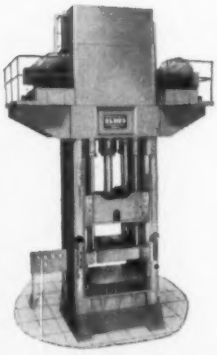


no pressing problem is too tough for an ELMES "Job-Fitted" HYDRAULIC PRESS

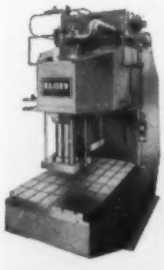
Elmes Presses are built in standard and special designs for metal drawing and forming, bending, straightening, forcing, powdered metal compacting, hobbing, etc.



HORNING PRESSES — for coining and truing wheel rims and similar items. Built in a wide range of sizes and capacities.



DOUBLE-ACTION DRAWING AND FORMING PRESS with 300-ton main slide and 100-ton blankholder slide. (Total tonnage is available for single action.) Single and Triple-Action types also available.



SPECIAL 600-TON C-FRAME PRESS — an adaptation of a standard C-Frame design. Combines two 300-ton presses in one. The unit can be operated with both cylinders in unison, or as individual presses.

The ingenious try-out press shown above is an exclusive creation of Elmes engineering. Center of activity in the Elmes Research Department, this versatile unit, with *four rams*, can be set up on *almost any operation that a hydraulic press is normally called upon to perform.*

Thus, a customer's out-of-the-ordinary metal pressing work can be tried out, and specifications for a production press of maximum efficiency accurately determined—not just on paper, but after having been *performance-proved under actual working conditions.*

Research with this press also permits the engineering of greater unusual-job adaptability into standard Elmes® Presses. As a result, where a standard Elmes Press does not fully meet a customer's requirements, it can be readily, efficiently, and economically modified in design.

Send us *your* pressing problem—you'll find that Elmes facilities can save time and money on your development work. See your Elmes Distributor, or write direct.

Elmes American Steel Foundries ENGINEERING DIVISION

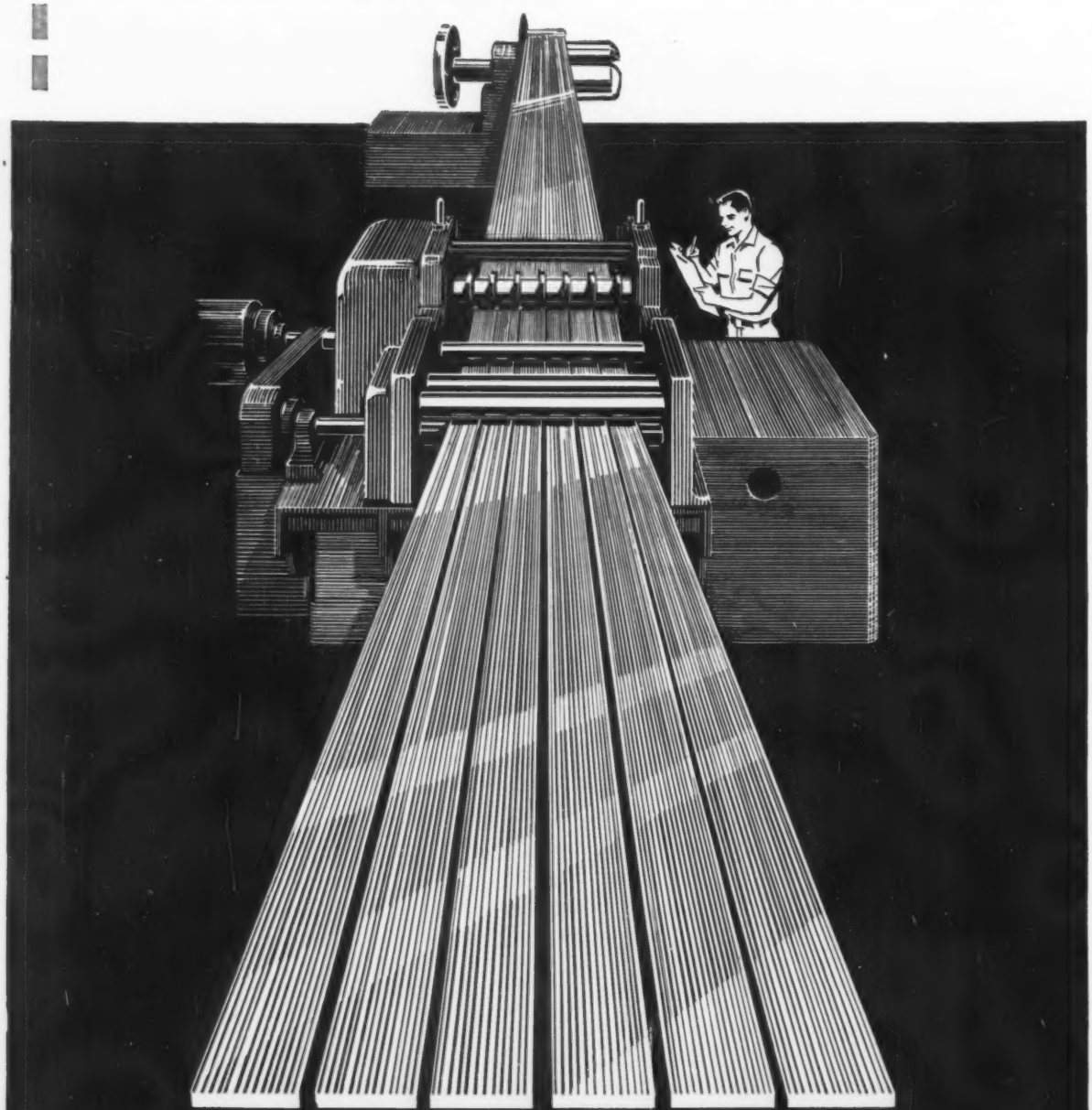
1166 Tennessee Avenue, Cincinnati 29, Ohio

METAL-WORKING PRESSES • PLASTICS MOLDING PRESSES • PUMPS • ACCUMULATORS

YODER

Rotary Slitters—Product dependability—integrity of manufacture—engineering for specific production needs have all contributed to establish Yoder equipment as the industry standard of excellence. Since 1909 Yoder-built machinery, including Pipe and Tube Mills, Roll Forming Equipment and Rotary Slitters, have earned world-wide customer satisfaction and recognition. Profit from Yoder's years of engineering and service experience. Send today for the illustrated Yoder Slitter Book.

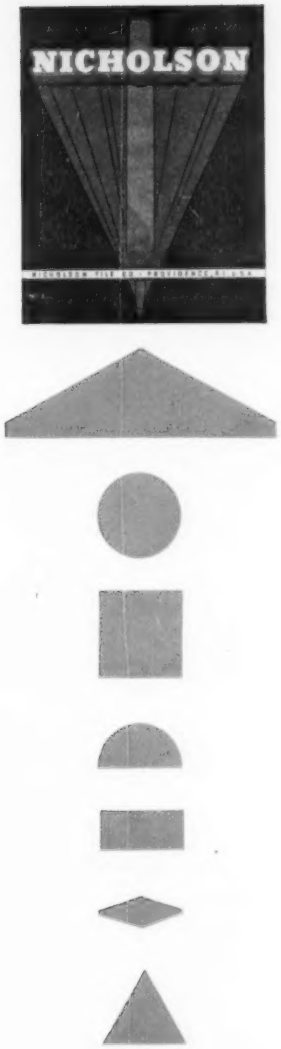
THE YODER COMPANY • 5510 Walworth Avenue • Cleveland 2, Ohio



ENGINEERING YODER MANUFACTURING

ROTARY SLITTING LINES

PIPE AND TUBE MILLS (ferrous or non-ferrous)
COLD ROLL FORMING MACHINES



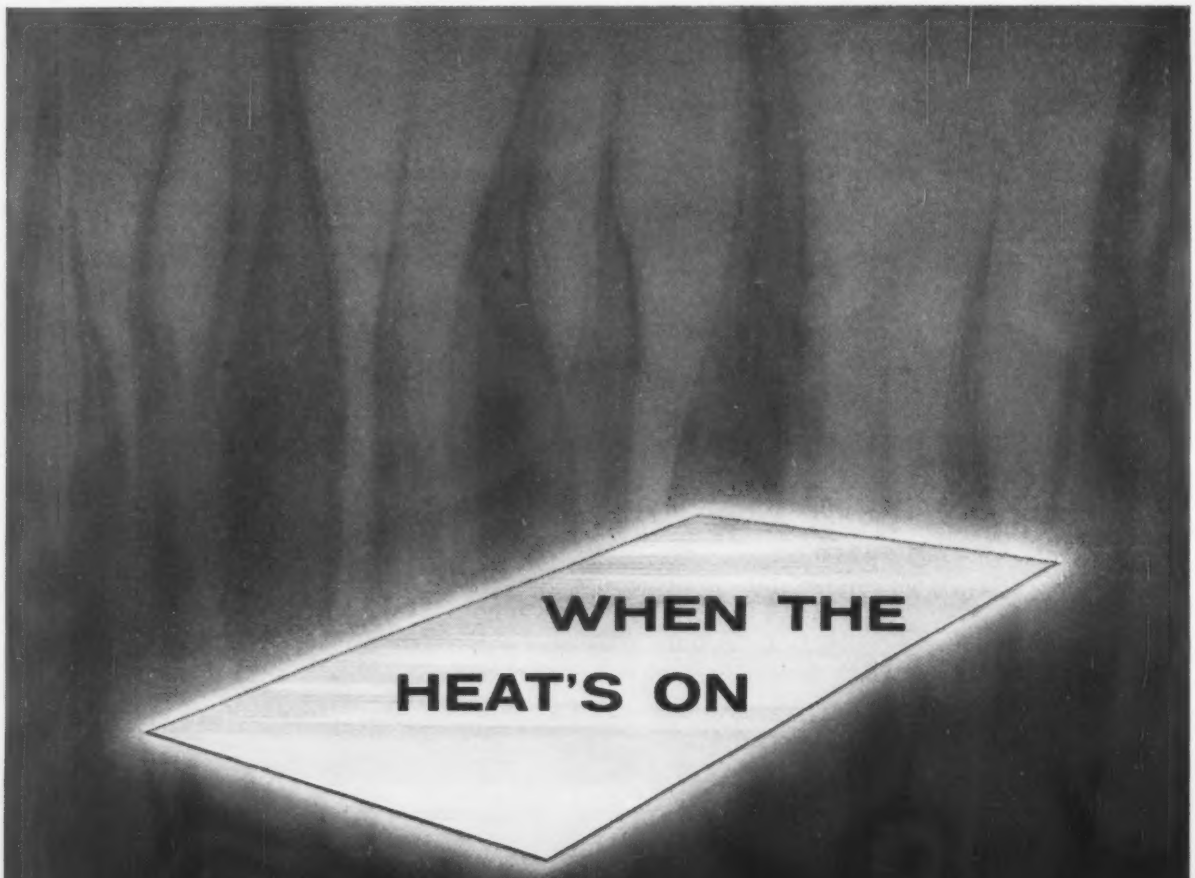
Fastest way to find any *file.* There isn't a file you can't find and get fast. First look in your Nicholson or Black Diamond Catalog. Then call your Nicholson or Black Diamond Industrial Distributor. • There are thousands of different files. There are General Purpose varieties for the usual kind of work. There are Special Purpose files to improve the work on specific materials—brass, lead, aluminum and steels, for example. Your Nicholson or Black Diamond File Distributor can meet your requirements for all file needs. • If you have a problem that calls for an entirely different kind of file, we'd like to work with you to solve it. Our research laboratory is available to you for this. • Your Nicholson or Black Diamond File Distributor is the man to call first if the subject is Files or Filing. Ask him now for a catalog, if you don't already have one. Write to us for "File Filosophy," a useful reference on files and filing.

* *Industrial Distributors provide the finest goods and services in the least possible time. Our products are sold exclusively through them.*

Files and Rotary Burs • Hacksaw and Band Saw Blades
Ground Flat Stock • Industrial Hammers

NICHOLSON

NICHOLSON FILE COMPANY, PROVIDENCE, RHODE ISLAND



. . . you need Eastern's 309 or 310 Stainless Steel

If you have a "hot" problem . . . finding metals to withstand 1200° to 2000° F . . . your answer could well be Eastern's 309 or 310 stainless. Both offer extremely high strength retention, corrosion and oxidation resistance, within this high temperature range . . . specific qualities that suggest new-use and new-product potential for many industries as well.

For specialized engineering assistance . . . or a helpful current Stock List . . . write or call the nearest distributor specializing in these Eastern alloys (addresses below).

EASTERN

STAINLESS STEEL

Baltimore 3, Maryland

PROMPT SERVICE FROM 3 STOCK SOURCES: Rolled Alloys, Inc., 5309 Concord, Detroit 11, Mich. • Rolled Alloys, Inc., 330 William St., South River, N.J. • Industrial Stainless Steels, Inc., 255 Bent St., Cambridge 41, Mass.

Specify your finish...

enforce it with the Brush Surfindicator!

With the Brush Surfindicator you can hold finishes *exactly* to specifications. No costly rejects. You get a specification finish at minimum cost! The Brush Surfindicator with its full range of accessories precisely measures any finish regardless of whether it's rough, smooth, in a hole, on a concave or convex surface—even on a razor edge.

Write for booklet "Control the Finish and You Control the Costs." Factory-trained distributors in all major cities.

brush INSTRUMENTS
DIVISION OF
37TH AND PERKINS CLEVITE CORPORATION CLEVELAND 14, OHIO

Our Cost Challenge!

Just invite us to bring the Surfindicator into your plant—put it to work on a machine—and we will prove that we can reduce your rejects. We're ready now!

Handy & Harman EASY-FLO 35 So Effective
Yale & Towne Redesigns 39 Parts for Silver Brazing

See This Being Made at the Design Show

...BRAZED Fork Lift Clutch Cage jolt and accident proof

Clutch cage for Yale & Towne's Industrial Trucks; fabricated by John V. Potero Company, Inc., Philadelphia.

One of the problems in operating a fast-moving, stop, go and back-up fork lift truck is accidental overtravel of gear-shifting from forward to reverse and vice versa. The result, of course, is a useless unit.

This simple clutch cage makes it impossible to jam a fork lift's gear box with resulting time lost for repair. The operator can't make a mistake.

The frame and shaft, of separate pieces, are made of mild steel. The shift lever lock, in the center of the shaft, is made of hardened steel. It is positioned by two tubular sleeves of mild steel. The entire assembly is hand torch-brazed with EASY-FLO 35 and HANDY FLUX with no loss of hardness.

Welding was considered but rejected because of the necessary follow-up of "spatter" cleaning. With simple silver brazing, flux removal is the only finishing operation required. This, plus the fact that silver brazing is much *easier* (your operator need not be a practiced "torchbearer"), has prompted Yale & Towne to redesign thirty-nine of their parts and components so that they can be brazed.

Come see this part being brazed at the Design Engineering Show in Philadelphia, May 25 through 28; at Handy & Harman's Booth 115. Any questions you may have between now and then about silver alloy brazing and the benefits it imparts to thousands of components, parts and assemblies, may be addressed to Handy & Harman, 82 Fulton Street, New York City 38.

FOR A GOOD START: BULLETIN 20.
This informative booklet gives a good picture of silver brazing and its benefits... includes details on alloys, heating methods, joint design and production techniques. Write for your copy.

Your NO. 1 Source of Supply and Authority on Brazing Alloys

HANDY & HARMAN
General Offices: 82 Fulton St., New York 38, N.Y.
DISTRIBUTORS IN PRINCIPAL CITIES

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ILLINOIS GEAR has a world-wide REPUTATION

for Dependability and Superiority

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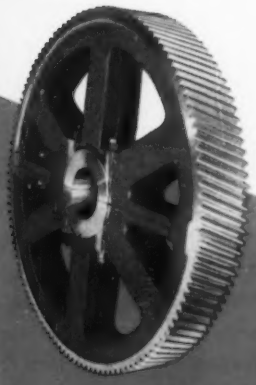

Back of every ILLINOIS gear is a tradition of dependability and superiority . . . a tradition that has become the priceless ingredient in the minds of men who specify, buy and use gears.

Wherever gears are used . . . the name ILLINOIS GEAR has become symbolic of a reputation . . . a matchless reputation that is known throughout industry and demonstrated by performance in all parts of the world.

If you are not now using or specifying ILLINOIS GEARS we invite you to profit from this background of quality and performance that has established a new concept in gear making.

Look for this mark ILLG® *. . . the symbol on finer gears*

ILLINOIS GEARS Reg. U.S. Pat. Off.

Gears for Every Purpose ... one gear or 10,000 or more

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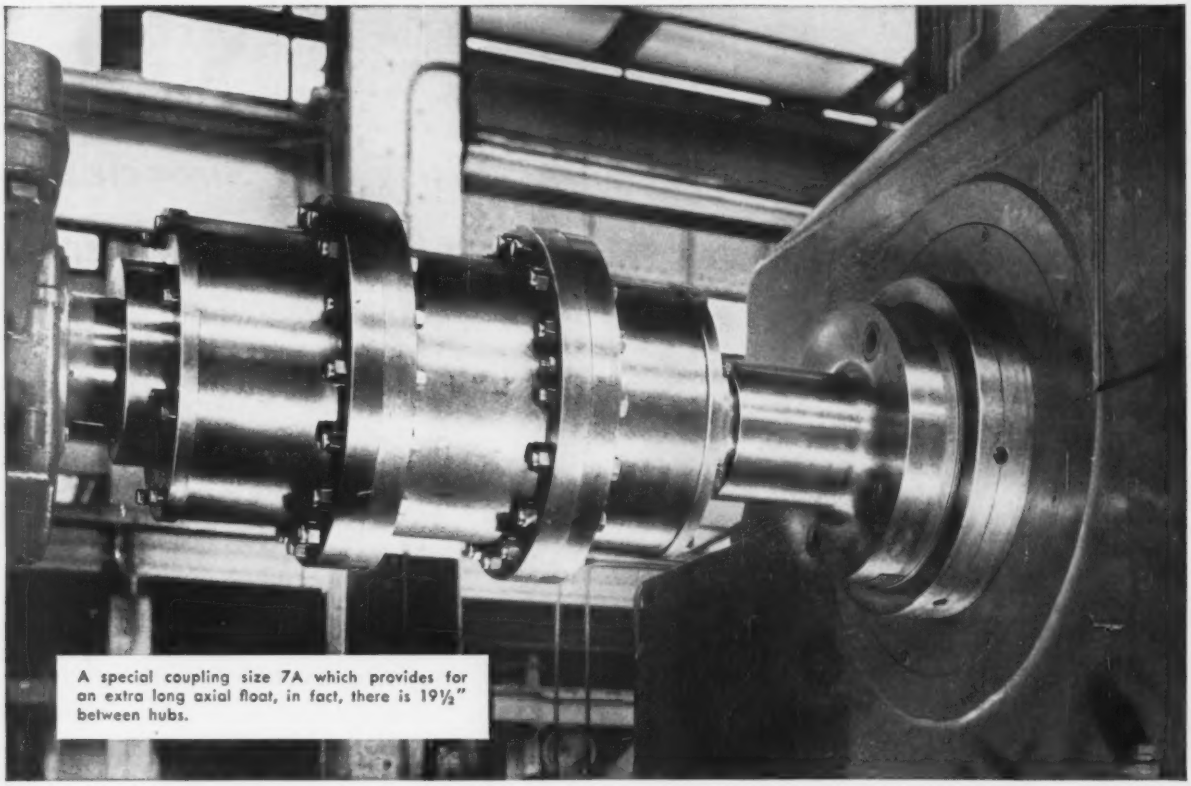
SPECIAL COUPLING PROBLEMS



A special coupling size 7A which provides for an extra long axial float, in fact, there is 19½" between hubs.

SOLVED

at JOHN WALDRON

From time to time, manufacturers are faced with special power transmission problems which cannot be handled by standard couplings. Sometimes they need a coupling for exceedingly high speed drives, sometimes a coupling for very large diameter shafts and for other special applications.

John Waldron, which is well known for its ability to produce high quality couplings also makes excellent special couplings to customer requirements. In the past, Waldron has made couplings that turn at speeds over 50,000 RPM, couplings which can take over 45,000 HP and couplings for particular applications such as continuous lubricated couplings, spacer types, shear pins, cut-outs and couplings for many other special installations.

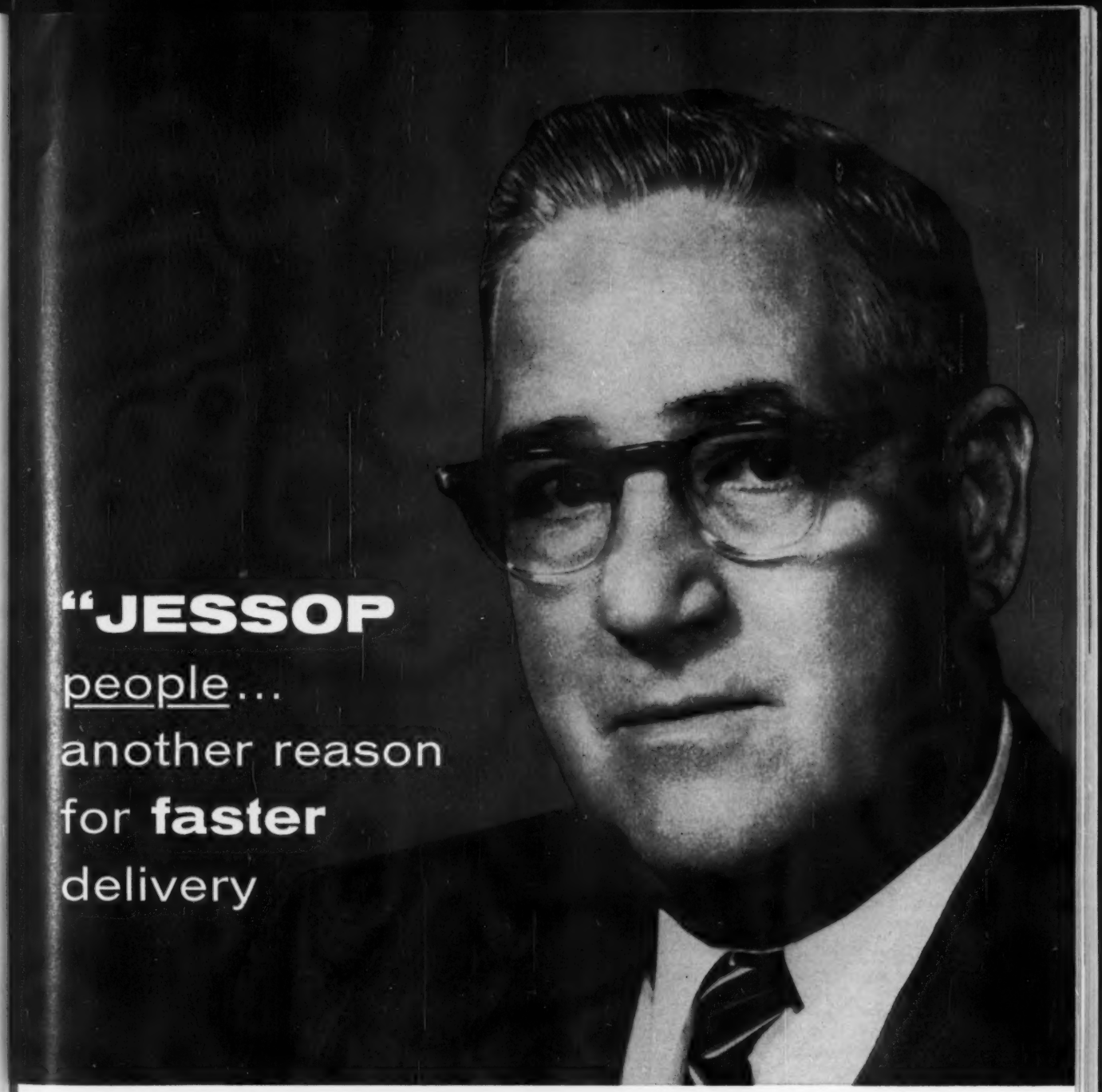
If you have a particular power transmission problem that needs a special coupling, call or write the John Waldron Corporation in New Brunswick, New Jersey. Their long experience in designing, and manufacturing couplings for special problems, may have already solved your problem for you.

M-R

JOHN **WALDRON** CORP.

Subsidiary of Midland-Ross Corporation

New Brunswick, New Jersey



"My name is C. E. Rice—executive vice-president of Jessop Steel Company and Green River Steel Corporation. During my 37 years in the industry, I've come to realize more and more just how important *people* are in a steel mill.

"And Jessop people are a good reason for your *confidence* in specifying Jessop specialty steels. Here's why . . .

"Most of our men are 20 year veterans, and a large percent of our personnel are stockholders. All are *personally* interested in making certain you get *exactly* what you order . . . and on the date promised!

"At Jessop, there's no buck-passing through a maze of super clerks. Every man works actively as a part of the fast-moving Jessop team.

"When you need high quality specialty steels, call Jessop. Our service will keep you sold."

VMA 6733

JESSOP
STEEL COMPANY
Washington, Pennsylvania
OFFICES IN PRINCIPAL CITIES

Stainless, alloy, tool, cast-to-shape, and forging steels, precision ground flat stock, and other specialty steels

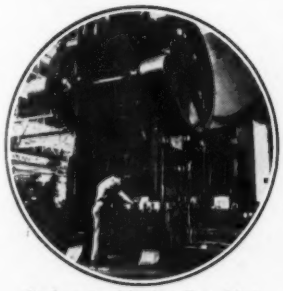
Tubexperience in action

What are your tubing requirements?

Do you know that tubing can be formed into many unusual shapes? That it can cut the costs of many parts formerly machined from bar stock? That you can get it in many standard analyses or special ones with unique physical and mechanical properties? That no matter what the shape, the physical characteristics, the mechanical properties, the type of application—Superior can supply your needs? Superior is the world's largest producer of small-diameter tubing. More than 120 analyses are offered, including many types of stainless, carbon and alloy steels, nickel and nickel alloys, beryllium copper, titanium, zirconium and super alloys.

Typical of the scope of Superior tubing are those listed on facing page—carbon hydraulic tubing, stainless and carbon mechanical tubing, leaded steel tubing with excellent machining and forming characteristics, pressure and super pressure tubing, tool steel tubing, and many other types to fit most requirements. For assistance in the selection and application of Superior tubing, write for the name of your nearest Steel Service Center stocking this product and a copy of Bulletin 41. Superior Tube Company, 2004 Germantown Ave., Norristown, Pa.

• SPECIAL SHAPES • COSTS • UNUSUAL PHYSICAL CHARACTERISTICS • UNIQUE MECHANICAL PROPERTIES



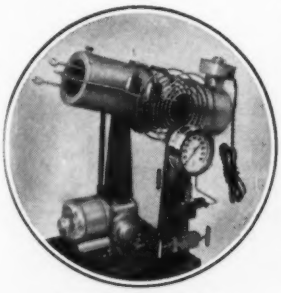
Carbon steel hydraulic tubing

FOR HYDRAULIC AND PNEUMATIC LINES:

Superior (SAE) Carbon Steel Hydraulic Tubing. Made from nonaging steel with high ductility properties in sizes from ⅛ in. through 1⅛ in. 100% hydrostatic pressure and flare tested. OD and ID surfaces are smooth, bright, uniform and protected with a special rust preventive. Recommended for pressures up to 3000 psi.

FOR HIGH PRESSURE APPLICATIONS:

Super Pressure Tubing. Single wall for pressures ranging from 15,000 to 30,000 psi. Available in ODs from .125 to .750 in. Made from Types 304, 316, 321 and 347 and in AISI Type 4130 alloy steel. Composite wall for pressures as high as 100,000 psi. Recommended combinations are low carbon steels and stainless steels, nickel base alloys and stainless steels.

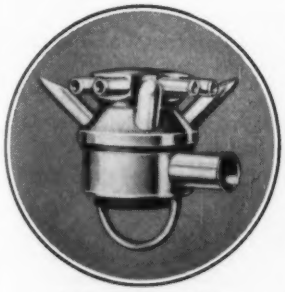


Super pressure tubing

FOR MANY MECHANICAL APPLICATIONS:

Seamless Carbon Steel Tubing. 11 standard and 3 special grades for an endless number of applications. Stocked by Steel Service Centers in a broad range of sizes with diverse mechanical and physical properties.

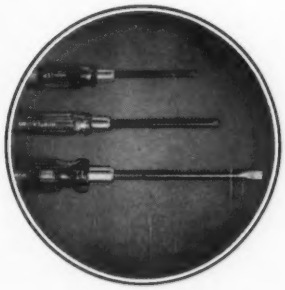
Seamless & WELDRAWN® Stainless Tubing. Type 303, for use where a free cutting material is required; offers high resistance to corrosion; assures good end-product surface. Also many other analyses.



Stainless steel tubing

Leaded Carbon Steel Tubing. Has built-in lubrication to permit faster speeds, heavier feeds. Will often reduce costs by requiring fewer finishing operations. Available in a range of ODs from .012 through 1⅛ in. in Leaded 1020.

Alloy Steel Tubing. In a number of different analyses. Designed for production of such parts as thread guides, races, gear and pinion parts, mandrels, etc.

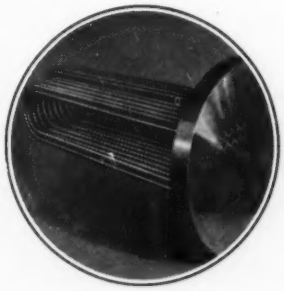


Tool steel tubing

Tool Steels. Produced from MT-1095 high-carbon steel and E-52100 alloy steel. Both grades have excellent strength, hardness and wear resistance. Both can be oil hardened to improve toughness and abrasion resistance. Available in sizes from .012 through ⅜ in. OD.

FOR HIGH TEMPERATURES REQUIRING HIGH STRENGTH, GOOD OXIDATION AND CORROSION RESISTANCE:

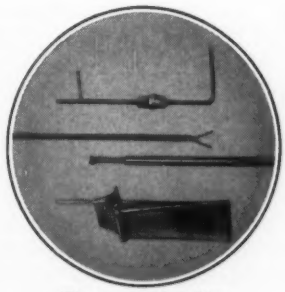
Super Alloy Tubing: Analyses include Types 316, A-286, 19-9DL, 16-25-6, Croloy 15-15N, Inconel X, Nichrome V, Hastelloy X, Hastelloy F, Waspalloy, Haynes 25 and N-155. Has a minimum stress rupture strength of 25,000 psi at 1000 hr. and 1200 F. Resists progressive scaling and other types of corrosion. Will not fail through brittle fracture or show excessive grain growth at operating temperature.



Heat exchanger tubing

FOR HEAT TRANSFER EQUIPMENT:

Heat Exchanger Tubing. Made from MT-1010, 502, 304, 304L, 316, 347, 348. Strict adherence to the highest commercial and military combined specifications. Quality controlled with uniform wall and extra close tolerances. Precise surface inspection. 100% flare and pressure tested. Excellent brazing and welding qualities.



Thermocouple tubing

FOR ELECTRICAL, ELECTRONIC AND SPECIAL APPLICATIONS REQUIRING GOOD CORROSION RESISTANCE:

Nickel Alloys: Analyses include Low Carbon Nickel, A Nickel, D Nickel, DURANickel, Monel, Inconel, Ni-Span C, Nionel, Nimonic, Hastelloy, Haynes 25, Permalloy, Chromel P, Alumel, Nichrome V and Invar. Many sizes, shapes and tempers. Excellent corrosion resistance, high strength and workability.

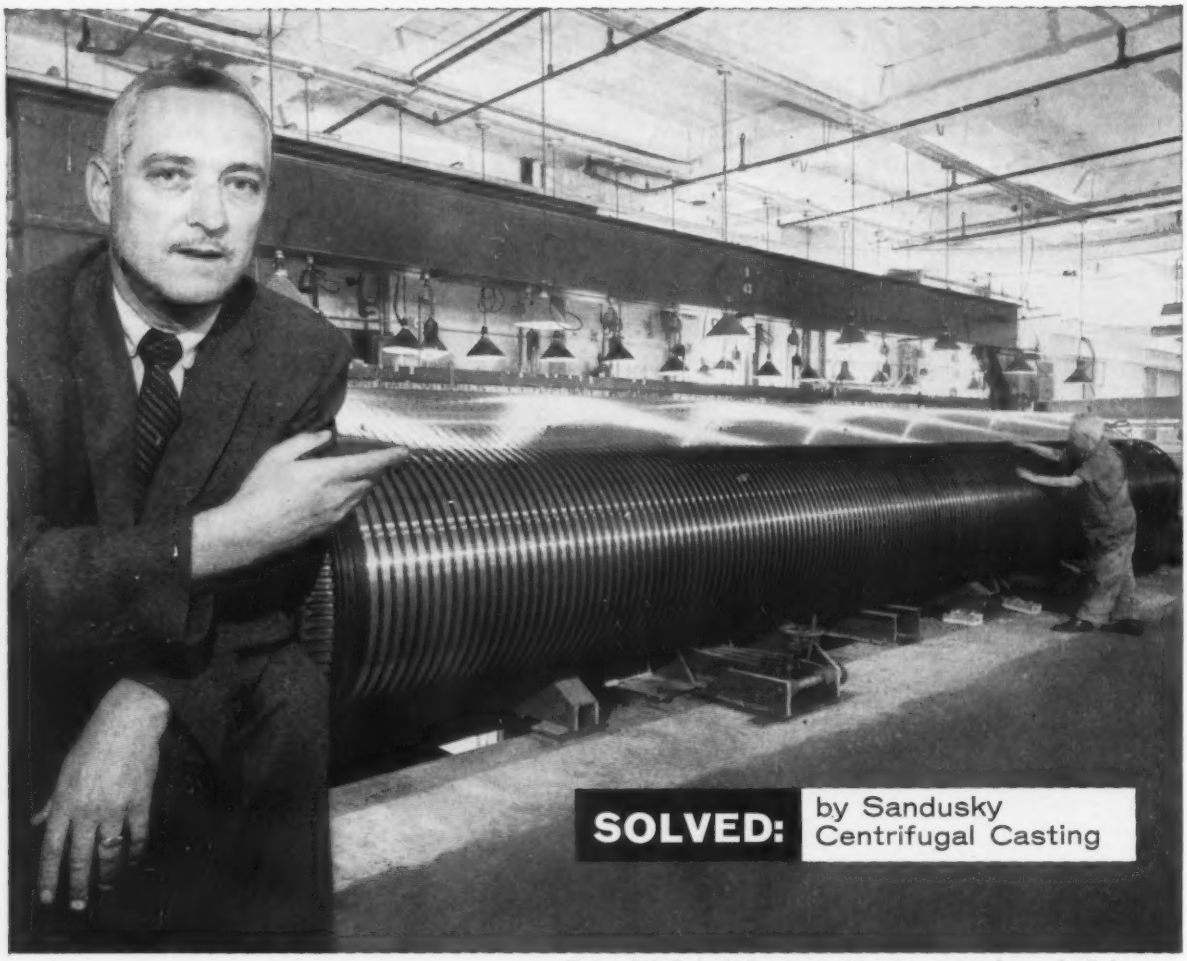
Superior Tube

The big name in small tubing

NORRISTOWN, PA.

All analyses .010 in. to ⅜ in. OD—certain analyses in light walls up to 2½ in. OD

West Coast: Pacific Tube Company, Los Angeles, California • FIRST STEEL TUBE MILL IN THE WEST



Eastwood-Nealley's chief engineer points out great size of grooved cylinder

Who else could cast this 22-ton cylinder for the world's biggest wire cloth loom?

To weave Fourdrinier wires up to 352″ wide for the world's newest and largest paper machines, Eastwood-Nealley Corp., Belleville, New Jersey, required a cylinder over 30 feet long.

Sandusky supplied this 44,685 lb. roll, centrifugally cast of SAE-1030 steel and rough machined to 363″ in length, 40⅝″ on the O.D., to be used as the backbeam on Eastwood's new wire cloth loom. Since the cylinder had to be machined with 176 extremely smooth 2″ x 2″ stirs (grooves) in which wire is wound, it had to be of *flawless quality.* Otherwise any voids or inclusions exposed by machining would nick the delicate bronze strands and cause the expensive wire cloth to fail.

Eastwood-Nealley's chief engineer, Clemson A. Bower, asserts: *"We chose a Sandusky Centrifugal Casting because only Sandusky could make such a gigantic cylinder without welding. We were confident that our special machining operation would be accomplished without costly re-makes, for in the 12 years we have been using them, we never found a single flaw in a Sandusky Centrifugal Casting!"*

When cylinders or piping are needed in your design, keep Sandusky Centrifugal Castings in mind. We can supply cylindrical products from 7″ to 54″ O.D. and up to 33 feet long—made from a variety of alloys including stainless, carbon and low-alloy steels as well as copper- and nickel-base alloys. Send for free booklet, "Your Solution to Cylindrical Problems."

SANDUSKY (S) *CENTRIFUGAL CASTINGS*
FOUNDRY & MACHINE CO.

5804

SANDUSKY, OHIO Stainless, Carbon, Low-Alloy Steels—Full Range Copper-Base, Nickel-Base Alloys

YOU CAN FIND BOTH THE BIGGEST AND THE BEST AT YOUR COMMERCIAL HEAT TREATER

1

2

3

1 *A new gas fired Homocarb said to be the world's largest.*

2 *A Vacuum Heat Treating Furnace for special materials.*

3 *Large capacity vertical furnace for heat treating large parts.*

The three furnaces shown on this page are units of the facilities of commercial heat treating plants in three different sections of the country.

Today, with the ever growing demand for *better* heat treating, economical volume equipment of this sort is becoming essential and the commercial heat treater has been alert to industry's requirements.

Quality work and versatility are the keynotes of this industry's objectives when treating the thousands of vital, intricate, and costly components of important products.

Whatever your heat treating problem, and whether it involves pounds or tons, always consult your commercial plant first.

CONSULT YOUR
COMMERCIAL HEAT TREATER

THERE'S A HEAT TREATING SPECIALIST NEAR YOUR PLANT

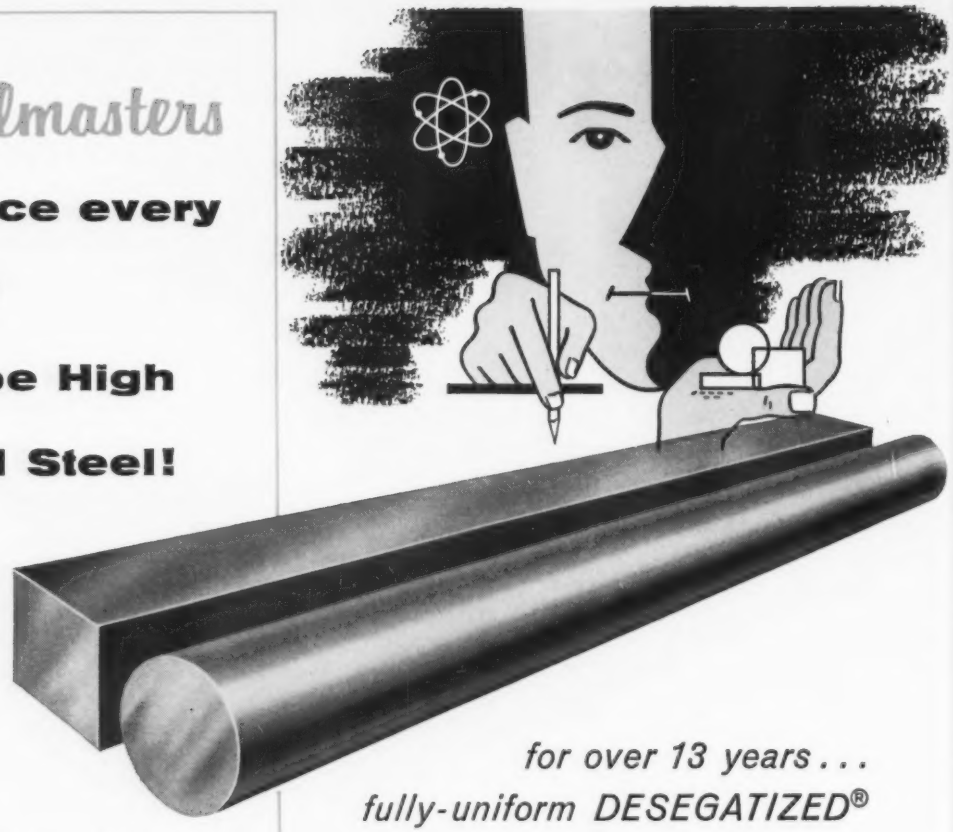
American Metal Treatment Co.
Elizabeth, New Jersey
Anderson Steel Treating Co.
Detroit, Michigan
Benedict-Miller, Inc.
Lyndhurst, New Jersey
Bennett Heat Treating Co., Inc.
Newark 3, New Jersey
Cook Heat Treating Co. of Texas
Houston 11, Texas
The Dayton Forging & Heat Treating Co.
Dayton 3, Ohio
Dominy Heat Treating Corp.
Dallas, Texas
Fred Heinzelman & Sons
New York 12, New York

Alfred Heller Heat Treating Co.
New York 38, New York
Hollywood Heat Treating Co.
Los Angeles 38, California
Ipsenlab of Rockford, Inc.
Rockford, Illinois
Ipsenlab of Canada Ltd.
Toronto, Ontario
L-R Heat Treating Company
Newark, New Jersey
Metallurgical, Inc.
Minneapolis 14, Minnesota
Metallurgical, Inc.
Kansas City 8, Missouri
Owego Heat Treat, Inc.
Apalachin, New York

Paulo Products Company
St. Louis 10, Missouri
Pittsburgh Commercial Heat Treating Co.
Pittsburgh 1, Pennsylvania
The Queen City Steel Treating Co.
Cincinnati 25, Ohio
J. W. Rex Company
Lansdale, Pennsylvania
Stanley P. Rockwell Company
Hartford 12, Connecticut
Scott & Son, Inc.
Rock Island, Illinois
Syracuse Heat Treating Corp.
Syracuse, New York
Temperature Processing Co.
North Arlington, New Jersey

Metalmasters

produce every bar of Latrobe High Speed Steel!



for over 13 years . . .
fully-uniform DESEGATIZED® High Speed Steels

It takes a team of metallurgical brains and production brawn to produce the fine, fully-uniform internal structures so typical in every bar of Latrobe's DESEGATIZED® High Speed Steel.

Here are *dependable* high speed steels, more so because of the step-by-step vigilance Latrobe maintains over every production phase—from the selection of raw materials to the warehousing of the final bar or billet form. Dependable, too, because you can rely on consistent, advantageous characteristics as you work and process these steels into the cutting tools and other end products you are proud to stand behind.

Need the best high speed steel? Call on those who, by deed, are Metalmasters in this particular field—Call Latrobe!

A fully-uniform high speed steel for every application . . .

- Electrite Double Six M-2
- Electrite Crusader
- Electrite Corsair
- Electrite No. 1
- Electrite Tatmo
- Electrite Tatmo V
- Electrite TNW
- Electrite Dynavan

Available in regular or XL® analysis for improved machinability

LATROBE STEEL COMPANY

MAIN OFFICE and PLANT: **LATROBE, PENNSYLVANIA**

Branch Offices and Warehouses in Principal Cities

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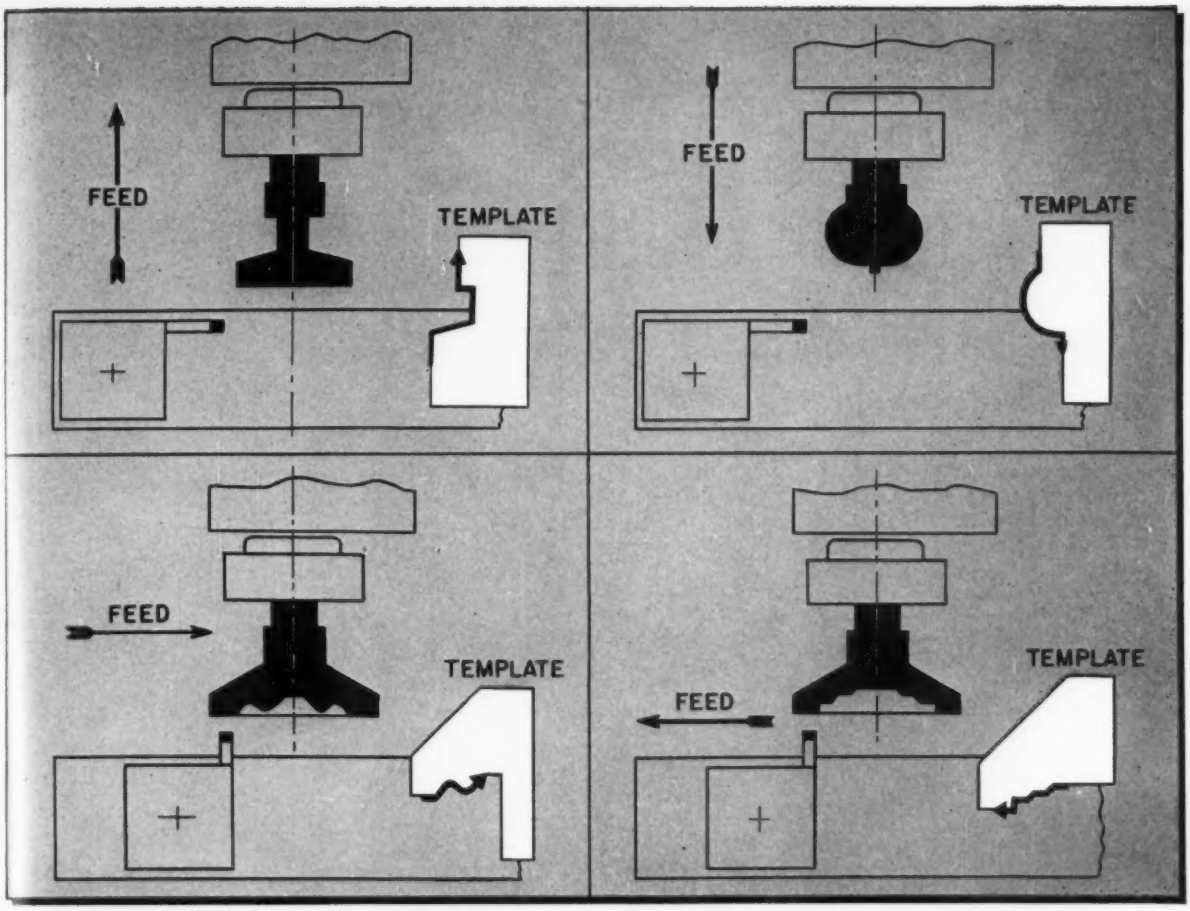


ALL FOUR of these Automatic Tracing Cycles are available with a SINGLE Jones & Lamson Turret Lathe

the man who needs a new machine tool is already paying for it

How's this for machine flexibility in one chucking? (1) You get all of the accuracy and tooling combinations offered by the standard J & L Turret Lathe. (2) You have more than 180° of tool travel control in each of four different automatic tracing cycles (you don't *have* to have *all* four, incidentally). (3) You do both rough and finish tracing (*with rough and finish tools*) in the same set-up. (4) You multiple-tool your tracing operations through 180° of tool control. (5) You have complete control for diameter with the conventional graduated hand wheel on either mechanical or *tracing* operations. (6) The original full swing of the Turret Lathe is retained with this tracer. (7) A single lever disconnects the tracer for standard turret lathe operation.

Such flexibility enables you to perform an amazing amount and variety of work with this new *Two-Dimensional Tracer* on J & L Saddle Type Turret Lathes.

It all adds up to: MAXIMUM WORK COMPLETED IN ONE CHUCKING; REDUCED HANDLING TIME; INCREASED ACCURACY. Write for further information.

JONES & LAMSON Machine Company • Dept. 710, 511 Clinton St., Springfield, Vt.

Turret Lathes · Automatic Lathes · Tape Controlled Machines · Thread & Form Grinders · Optical Comparators · Thread Tools

LINK-BELT SS CLASS DRAW BENCH CHAIN

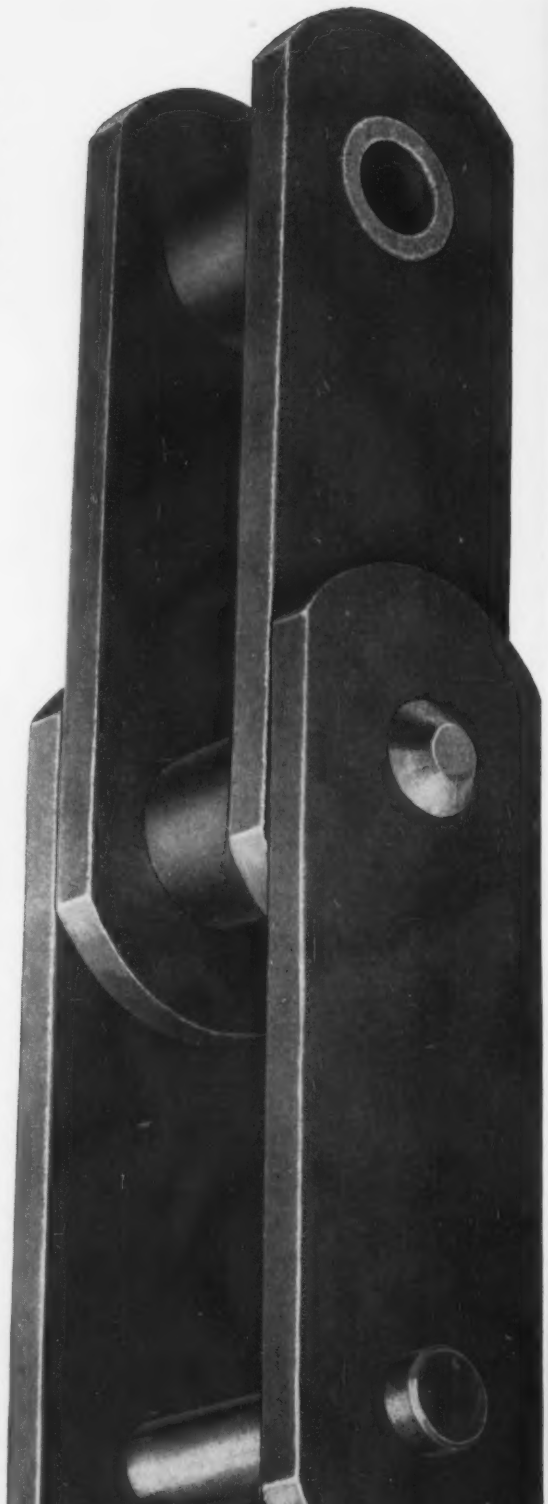
gives longest chain life . . . resists highest chain pull

Link-Belt SS Class draw bench chains won't give in—whether they're used on benches having capacities of 5000 lbs., 100,000 lbs. or greater. Parts are accurately machined, after hardening, by a special process that assures longer chain life on even the highest chain pull applications.

These rugged chains, of all-steel construction, are available in a variety of pitches and strengths to suit any draw bench requirement. Chains, such as the one illustrated, have hardened pins, bushings and sidebars. Pins and bushings are securely locked in the sidebars by controlled press fits. Block type chain, with hardened pins and sidebars, is also available. Pins on this chain are also securely locked in the sidebars by controlled press fits and sprocket contacting surfaces of the block links are accurately machined to assure proper tooth engagement.

For further facts, call your nearest Link-Belt office or stock-carrying distributor, listed under CHAINS in the yellow pages of your phone book. Or write for our new comprehensive Catalog 1050.

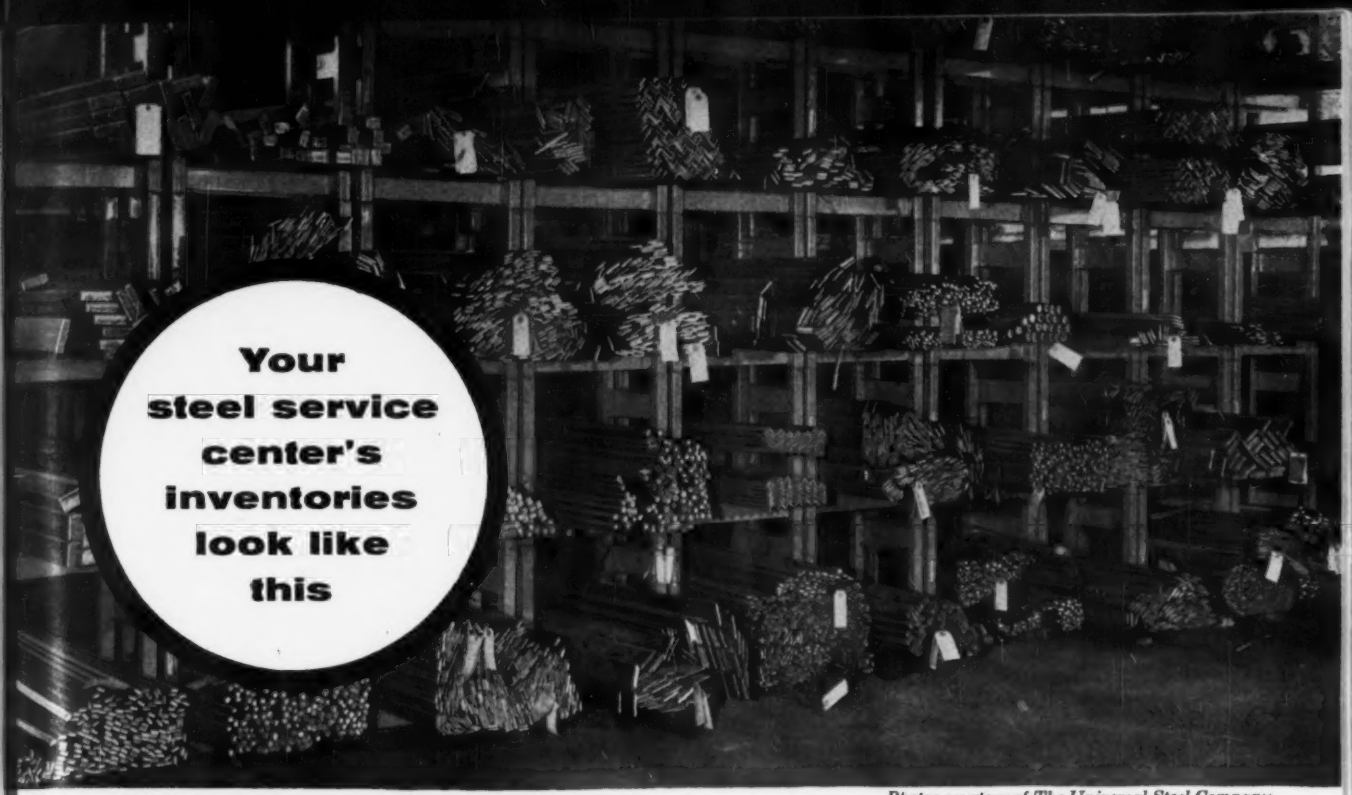
15,067



LINK-BELT

CHAINS AND SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World.



Photos courtesy of The Universal Steel Company

To cut inventory costs, make your Youngstown Warehouser your local "steel service center". Make full use of his complete local stocks, fast delivery service. His one-source service simplifies your purchasing and bookkeeping, too. You'll find him an efficient, time-saving, partner-in-production.

AMERICAN STEEL WAREHOUSE ASS'N

QUALITY YOUNGSTOWN SERVICE

THE
YOUNGSTOWN
SHEET AND TUBE COMPANY
Youngstown, Ohio

Manufacturers of Carbon, Alloy and Yoloy Steel

SPS RELIABILITY / *A dynamic standard of predictable performance*

RECOMMENDED SOCKET SET SCREW TIGHTENING TORQUES
(in.-lb.)

Screw Size	Unbrako	Set Screw B	Set Screw C	Minimum Differential %
#4	5	3.9	3.5	28
#5	9	7.8	7.4	15
#6	9	7.8	7.4	15
#8	20	14.7	14.5	36
#10	33	26.5	25	25
¼	87	62	60	40
5/16	165	122	125	32
3/8	290	198	225	29
7/16	430	309	350	23
½	620	460	500	24
5/8	1225	1106	1060	11
¾	2125	1540	1800	18
7/8	5000	3660	4600	9
1	7000	5025	6500	8

High torque UNBRAKO socket sets are available as follows: Sizes, #0 through 1 in.; materials, alloy steel and 18-8 stainless steel; Types, plain cup point (microsizes and stainless)—self-locking with knurled cup point (#4 through 1 in.)—self-locking with Nylok (plain cup point).

Designed for automation . . .

High Torque UNBRAKO socket set screws with greater holding power, greater dimensional accuracy

Holding power—a vital factor in the selection and application of a set screw—is the result of the seating force developed by tightening the screw. Invariably the tighter a screw is wrenched into place, the greater will be the holding power. Recommended seating torques for High Torque UNBRAKO socket set screws are up to 40% higher than those for ordinary socket set screws. And the cup point, knurled counterclockwise, resists their backing out under vibration.

In addition to greater holding power, dimensional accuracy of length and OD, with consistent physical and mechanical properties from lot to lot, makes high torque UNBRAKO socket screws ideal for automation. Major diameters are held strictly to Class 3A thread tolerance to permit automatic feeding without jam-up. Socket depth and size are highly uniform to permit the driver to engage the socket in a split second and drive the screw home with speed and precision. Threads are fully formed to Class 3A fit to make the whole screw stronger and provide accurate mating. Heat treatment, in atmosphere controlled furnaces, prevents decarburization and provides hardness and strength for long wear.

High torque UNBRAKO socket set screws are stocked by authorized SPS industrial distributors. Ask the one nearest you for complete details. Or write SPS—manufacturer of precision threaded industrial fasteners and allied products in many metals, including titanium. Unbrako Socket Screw Division, STANDARD PRESSED STEEL CO., Jenkintown 17, Pa.

Visit us at Booth No. 617
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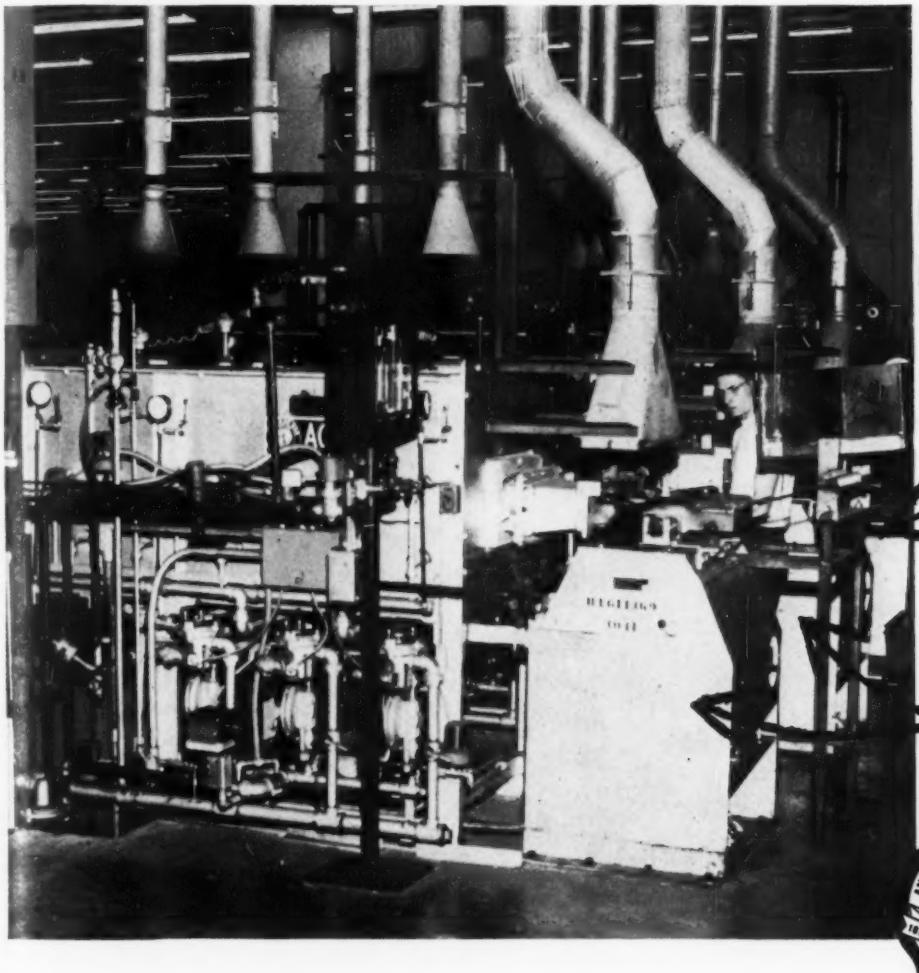
PRODUCTION HEAT TREATING



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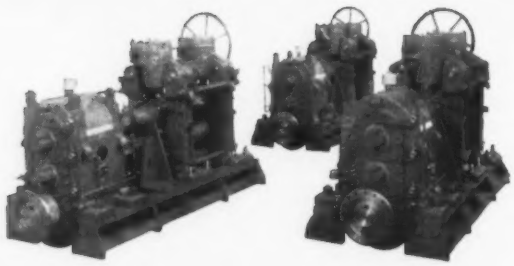
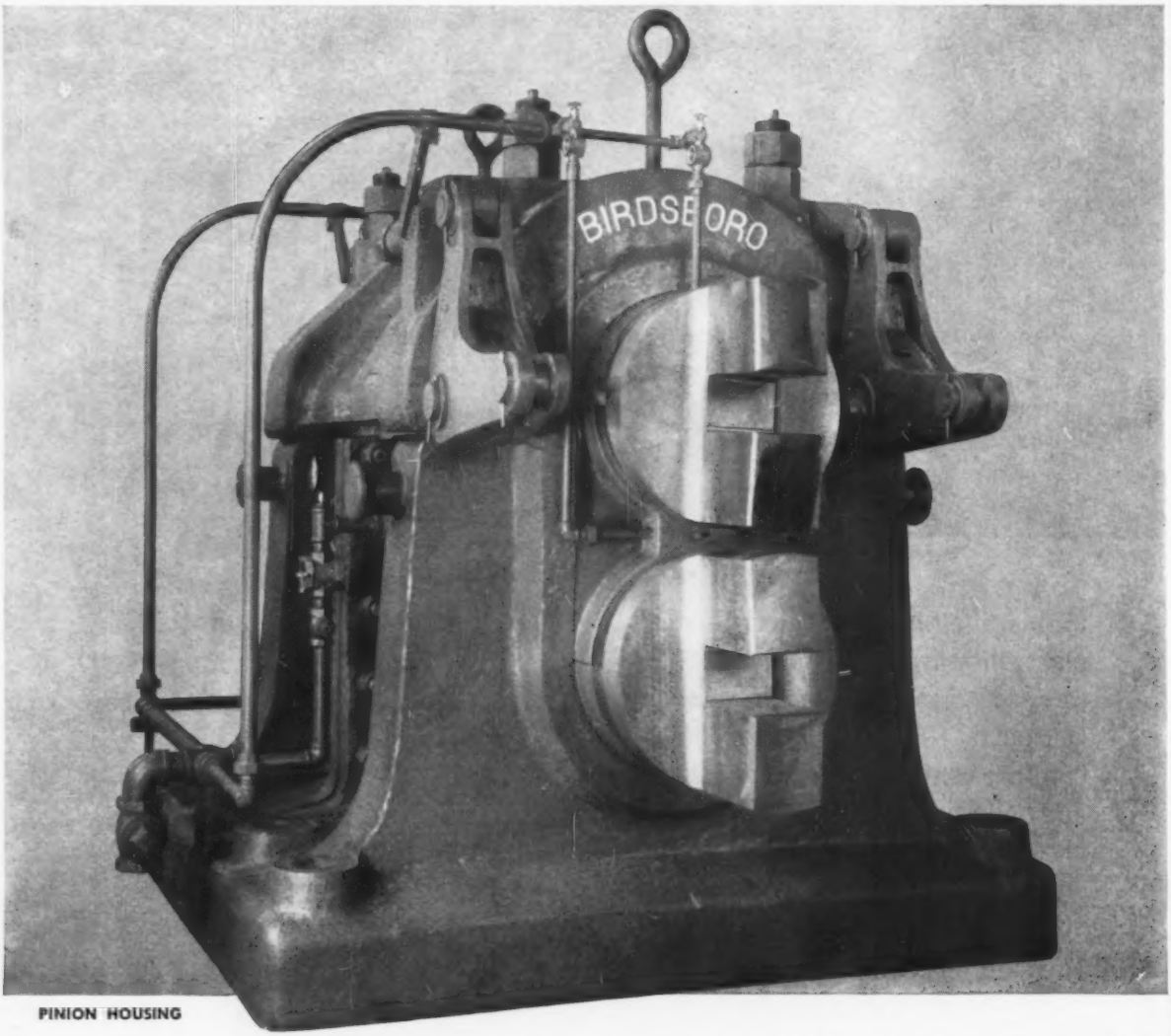
the answers to your steel mill productivity problems are supplied by **BIRDSBORO** *design ideas*



Rising costs can best be offset by a corresponding rise in productivity. The design of automated and semi-automated equipment now becomes more important than ever before. BIRDSBORO, anticipating this trend, has placed considerable emphasis on design in recent years. As a result, ideas have become as important a product as the finished equipment. This application of design ideas through creative engineering has given BIRDSBORO a number of industry firsts and a fine backlog of experience to help in improving your productivity. Contact your BIRDSBORO representative for details of recent steel mill equipment design successes. *Sales Department, Engineering Department and Plant:* Birdsboro, Pa., *District Office:* Pittsburgh, Pa.



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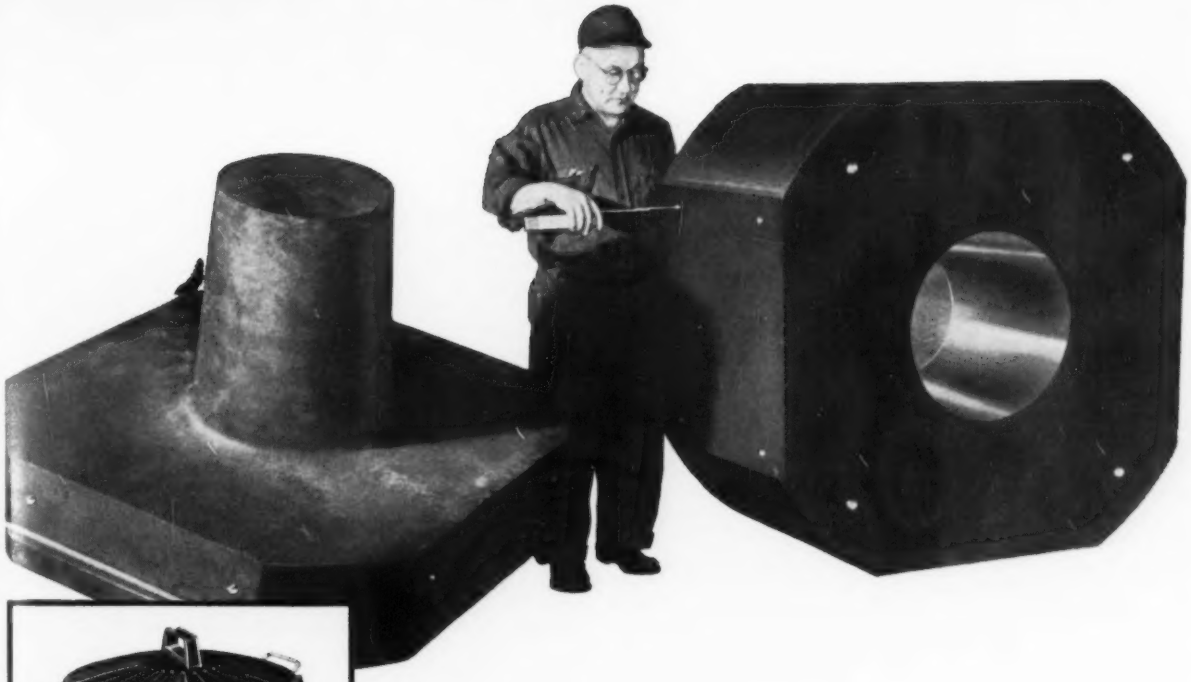

USE FINKL BLOCKS FOR DIES AND MOLDS...

Impressions are our business!

These two rough machined blocks were furnished from Finkl electric furnace steel. When finish machined they were used by Columbus Plastic Products, Inc. of Columbus, Ohio, to mold their 24-gallon polyethylene Lustroware Trash Cans such as the one shown at the left. The four foot square blocks weighed 21,996 pounds when shipped.

This was a large mold, but regardless of size, the advantages of Finkl products are many:

- Finkl electric furnace steels are especially balanced in composition to provide uniform hardness and a high polish which is reflected on every plastic part.
- Relatively high tempering temperature promotes ductility and eliminates residual stresses.
- Finkl special steels have Special Machining Quality which appreciably reduces sinking time without impairing any quality factors.
- Finkl special steels cover the full usable hardness range from Temper H (477-444 BHN) to Temper 4 (293-269 BHN).
- Finkl special steels are available in all sizes, and tempers to handle virtually any die or molding requirement.

These advantages can mean savings to you in time and money. Call a Finkl representative the next time you are planning forming production whether it is molds for plastics or die blocks for closed die forgings.

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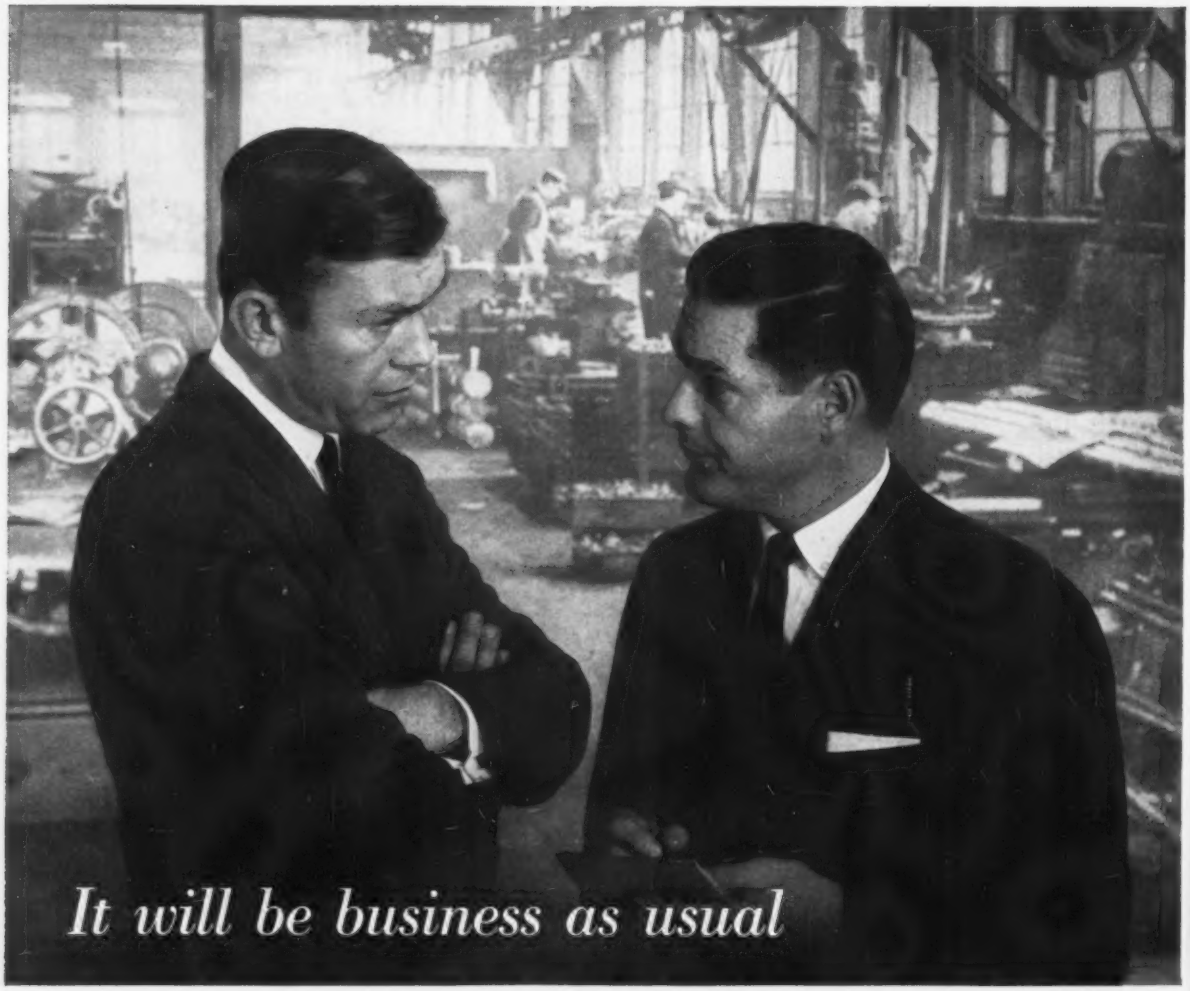

at Smith & Cross

. . . with the help of the Ætna Life's Business Planning Department

Arthur H. Smith and Robert Cross are partners in a machinery business. Their company has grown over the years and looks to a prosperous future. Both Smith and Cross are known as good businessmen. They are aware that when either of them dies the partnership, by law, ceases to exist. The surviving partner and the heirs of the deceased partner are left to pick up the pieces. Therefore, with the help of their Ætna Life representative, attorney and accountant, they set up a plan to assure continuation of the business and security for their own families. If you own or operate any kind of business, it will pay you to investigate the vital need for a business continuation plan — and no one is better equipped to serve your interests than the Business Planning Department of your local Ætna Life General Agency.

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Brass and other copper-based strip, rod, and wire from Riverside produces consistently better end products for you—free of weak points that result in rejected pieces or whole batches.

How do we do it? By *continuous casting*, a process we introduced to this country—a process that eliminates air holes and impurities, leaving a dense, homogeneous casting for better wire-drawing and other fabrication requirements.

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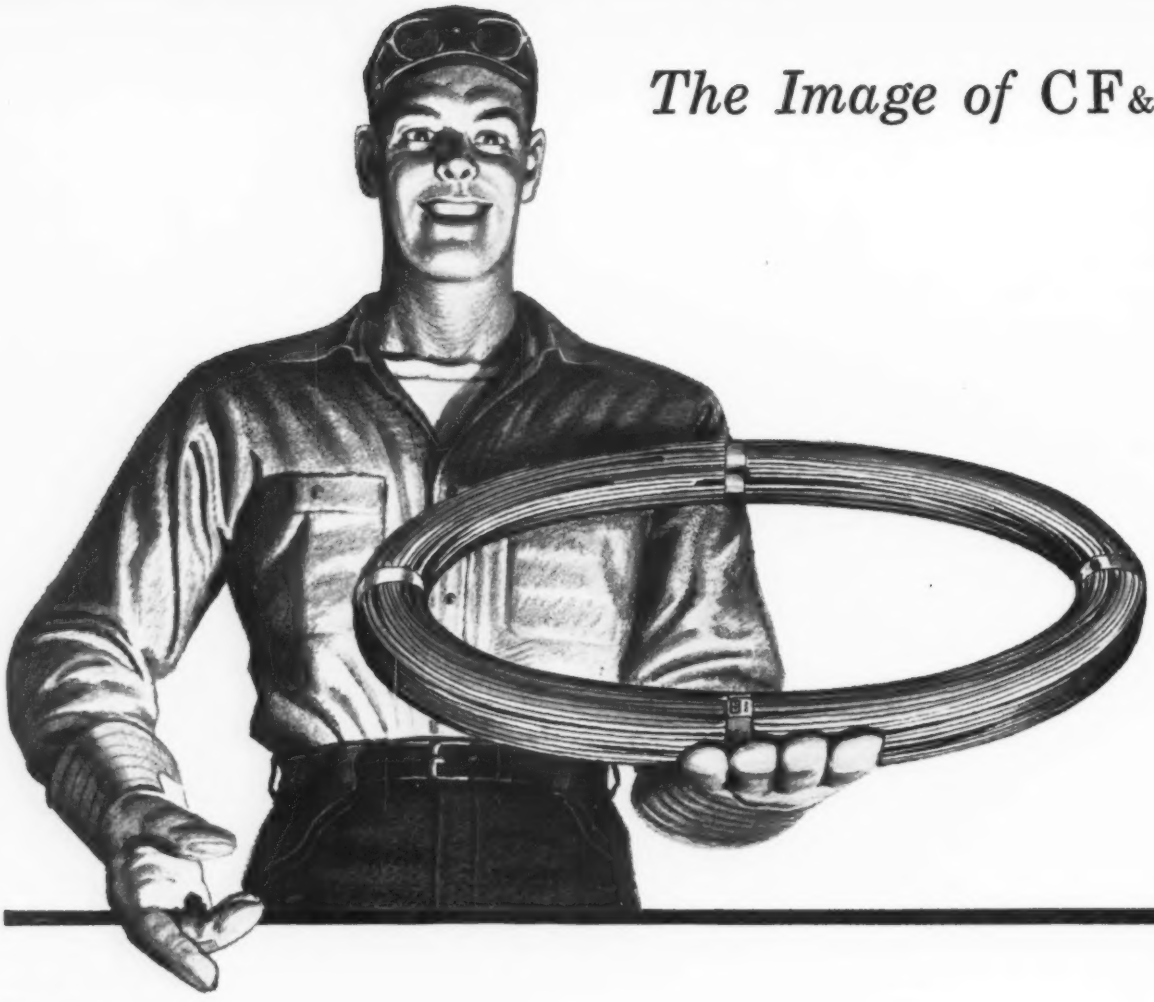
The Image of CF&I



THE CF&I GIANT stands for "steelmanship"—the science of developing new and improved steel products for all industries. An example of how CF&I's continual research benefits *wire users* is our new Black Satin finish on Round and Square Oil Tempered Wire.

Available only from CF&I, Black Satin is a fine, powdery finish that works as a lubricant during coiling and crimping operations. This unique finish is the result of tempering the wire under electronically controlled atmospheric conditions.

Uniformity of Black Satin Oil Tempered Wire Cuts Production Costs

This special finish is uniform throughout the length of each coil . . . from coil to coil . . . from lot to lot. Black Satin's powdery finish prevents surface scale "flake off"—a problem with ordinary Oil Tempered finishes that require constant readjustment of your initial setup. Your benefits: less downtime, less scrap loss, uniform end products.

Black Satin Finish Increases Output

To lengthen your production runs, CF&I can supply you with this top quality Oil Tempered Wire in continuous unwelded lengths up to 600 lbs. These large coils minimize the extra rethreading time required by smaller coils.

This outstanding Oil Tempered Wire is available in a full range of gages and sizes, in steel-strapped or wire-tied coils from 16″ to 72″ in diameter. Straightened and cut lengths from 6″ to 24′ (or longer) can also be supplied.

Identification Tags Assure Uniform Wire Grades

To assure the same steadfast quality from coil to coil, CF&I color tags every coil for a reliable record of its processing, testing and intended use. By merely returning the tags when you reorder, you automatically receive the same uniform quality on all subsequent orders for the same grade of wire.

offers . . .

BLACK SATIN

a unique Oil Tempered wire finish to cut your production costs

These tags show:

Heat Number_____

Size_____

Tensile Strength_____

Date_____

Coil Number_____

Test Sheet Number_____

This color tag system also facilitates your job of inventory control, in-plant storage, and materials handling.

Besides Oil Tempered Wire, CF&I supplies all types of quality steel wire—and you can specify your wire *packaged for your production*. These different packages offer you various operating advantages from less machine downtime to easier unloading, storage, inventory control and continued cleanliness of the wire.

Because of CF&I's wide diversity of wire types and wire packages, it would pay you to make CF&I your source of supply. Our experienced representative will be glad to discuss your requirements with you. Call him today.

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

6770

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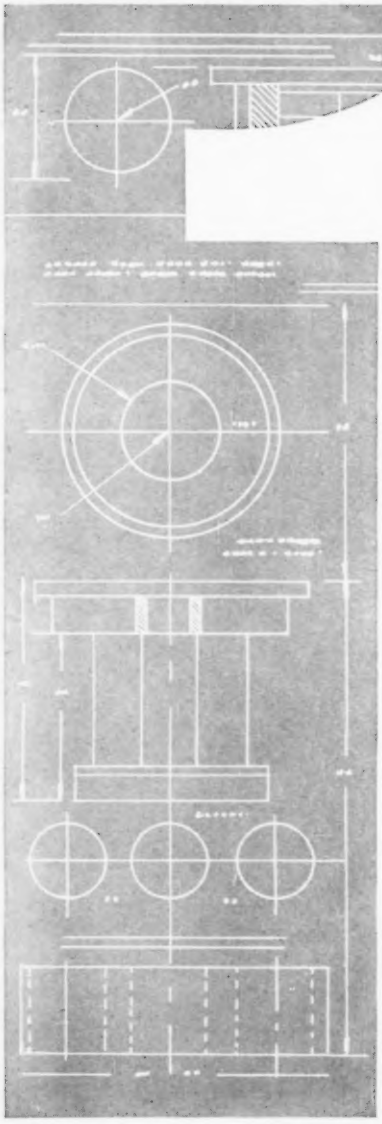

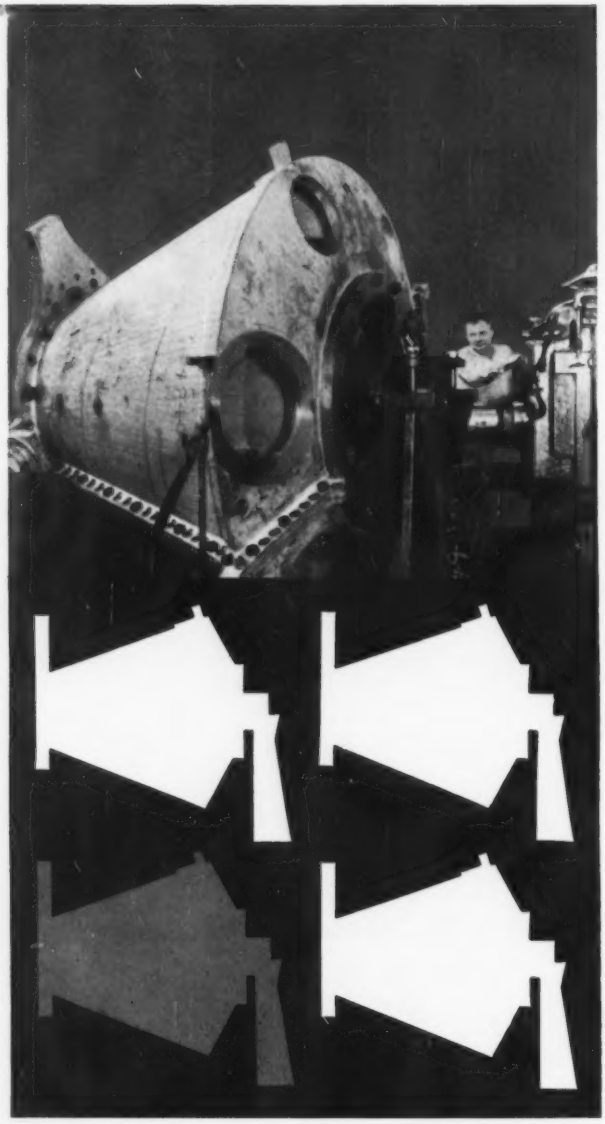

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Generations of experience and ability are at your service . . . fostered in our historic Wetherill Plant and carried through to the present improved and modernized Sun Ship shops. Add to this our ability to assist in design and engineering and discover the ideal answer to your problems of sub-contracted constant-flow production . . . or one order, one unit machines. Contact our Sales Engineering Department now . . . before your needs arise.

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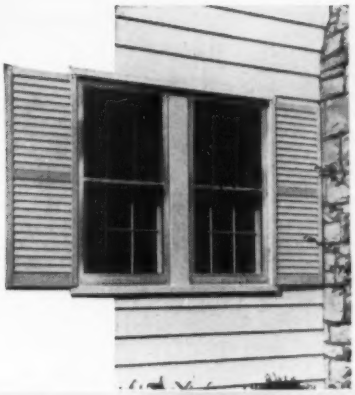

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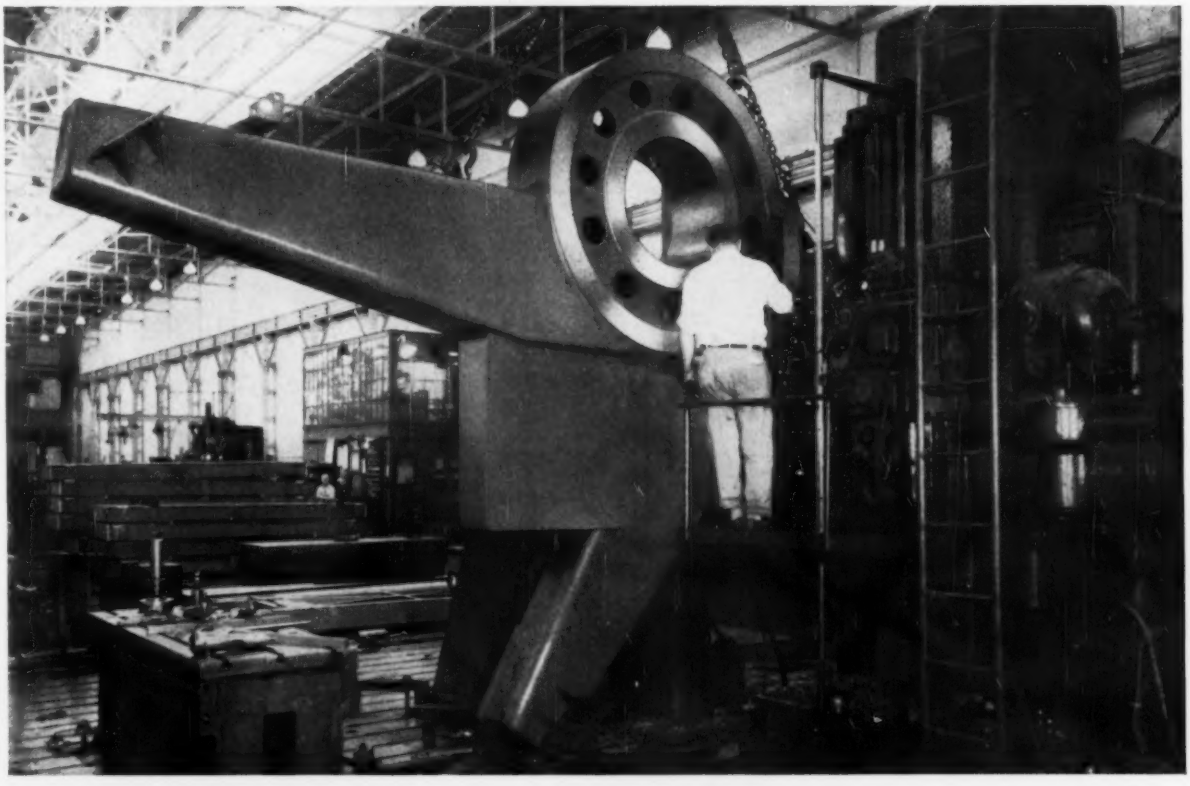

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FEDERAL'S NEW TRIM-LINE PRESS WELDERS

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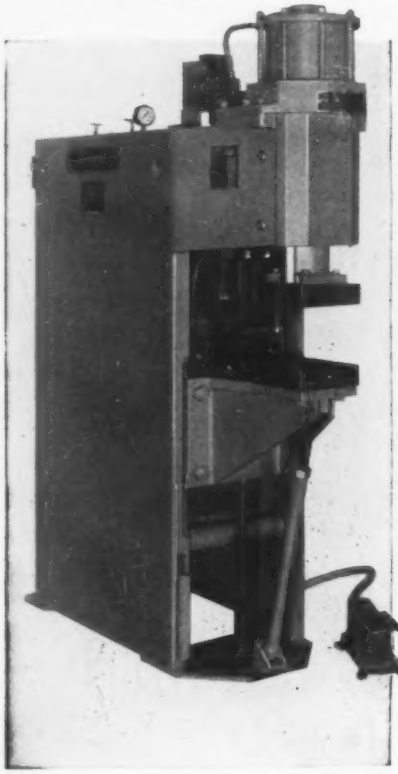
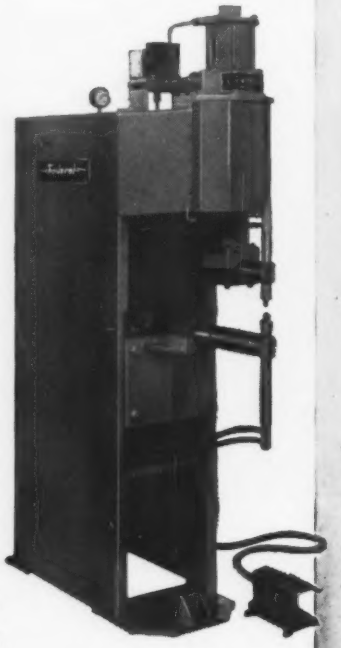
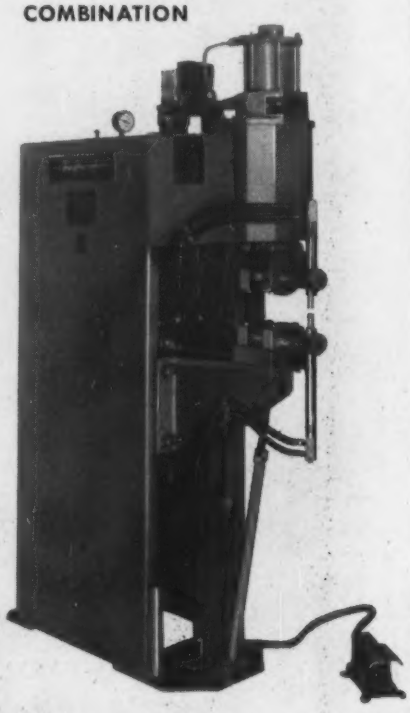


SPOT



COMBINATION



Available from stock in four sizes in capacities of 30 to 500 K.V.A.

Completely new . . . these advanced design trim-line press welders will give you maximum production in a minimum floor area. What's more their compact, simplified design assures easier operation, less maintenance and ready accessibility.

Designed and built by Federal, one of the largest and most experienced resistance welder manufacturers, these new welders are available from stock as spot welders with horns, projection welders with platens, or combination spot and projection welders. Each type is available in a full range of standard throat depths, welding forces and transformer sizes.

Many standard automatic welding attachments are available to increase production with these standard machines.

Listed below are some of the features. For more information get in touch with the Federal representative nearest you. Ask for Bulletin P-59 and Special Tooling Bulletin AWA-59.

COMPLETELY ALL NEW DESIGN FEATURING:

- **New One Piece Frame** . . . stronger, less floor area, greater accessibility.
- **New Anti-Friction Slide** . . . hardened and ground slideweighs —eight anti-friction roller mount gives maximum stability —permanently lubricated rollers—simple adjustment.
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- **Stock Models** . . . all components built for stock, quick delivery.
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...need Vancoram Ferrocolumbium! For years, ferrocolumbium has been used as a stabilizer in the highest quality stainless and heat-resistant metals. Now its use has been given new impetus by Vanadium Corporation through the development of a production process which makes Vancoram Ferrocolumbium ideal for these metals. The columbium content is especially high, while undesirable elements are kept at levels well within accepted standards.

THERMOCOL* (*Exothermic* Ferrocolumbium) is a special product that permits large amounts of alloy to be added to the ladle without excessive temperature loss, and without contact between the alloy and the furnace slag—thus assuring higher, more consistent recoveries in the steel. Write for more facts about the unusual advantages of using Vancoram Ferrocolumbium Alloys and THERMOCOL. Vanadium Corporation of America, 420 Lexington Avenue, New York 17, N. Y. • Chicago • Cleveland • Detroit • Pittsburgh

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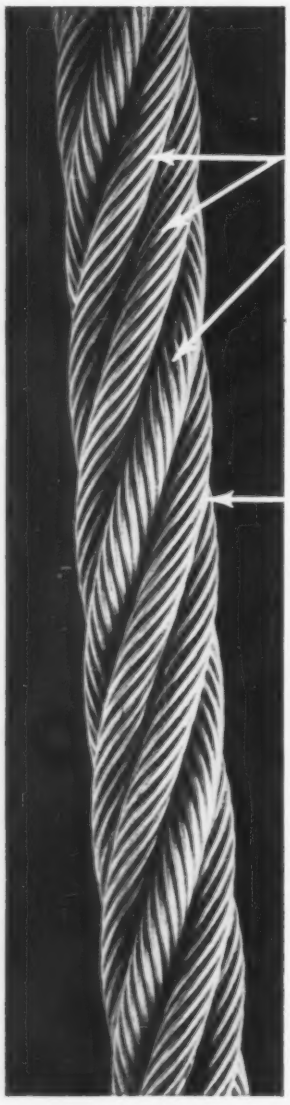
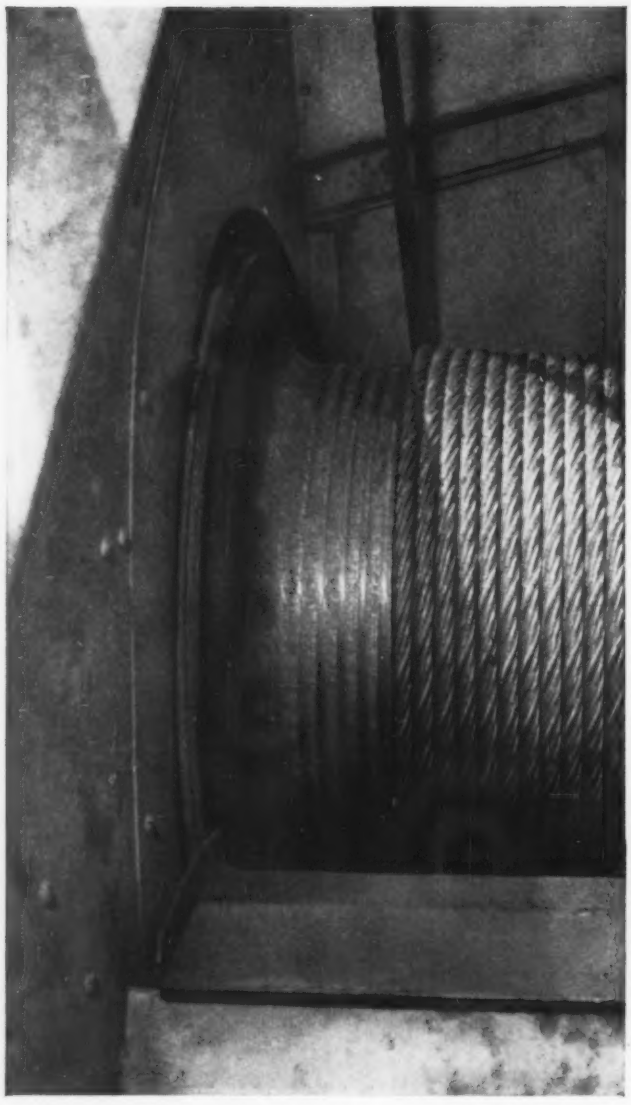


Herringbone's two pairs of Lang lay strands and one pair of regular lay strands provide the ideal combination of maximum flexibility with good stability.

Finer wires inside contribute to Herringbone's excellent drum-winding characteristic.

Heavier outside wires in each strand have greater resistance to abrasion.



"...we would never hesitate to recommend it"

GRAY & FEAR, CONTRACTORS

This company continues: "We have been using your Roebling Herringbone* for about one year. We find it is one of the best ropes we have ever used, outlasting previous ropes three to one. It is good that such a reliable rope is available."

This is a direct field quote on the most remarkable development in wire rope in years . . . a new concept in wire rope design. Roebling Herringbone is the regular lay and Lang lay wire rope—two-ropes-in-one rope—combining the best features of both.

Herringbone delivers extra flexibility, extra abrasion resistance, unusual structural stability, extra resistance to shock, easy operation over sheaves and drums and smooth spooling properties.

We recommend Herringbone without reservation for general hoisting and the entire range of heavy-duty equipment. Your Roebling Distributor or Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey, will give the full and fabulous details. *Reg. App. For

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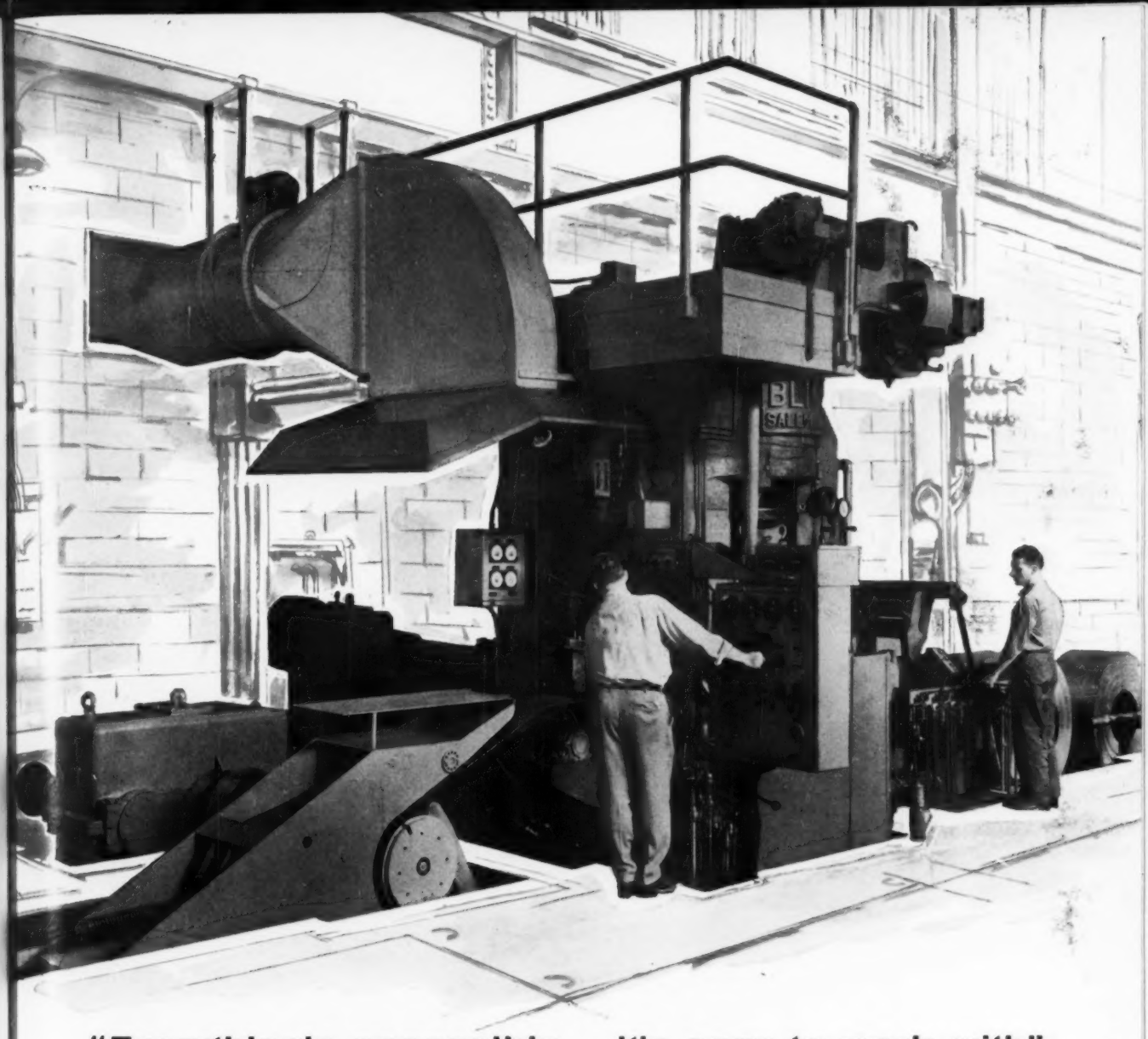


"Everything's accessible... it's easy to work with" says Thompson Wire of its new one way cold mill

The operating men at Thompson Wire's Sparrows Point plant especially appreciate the accessibility of controls on their Bliss one way cold mill. That's easy to understand when you realize that they use the mill to convert a wide variety of material ranging from ordinary carbon steels to "aircraft quality" and special saw blade steels.

The gages they roll range from .015" to .125", the widths from 14" to 20". The speed of the mill varies, of course, with the steels being rolled, but its top average running speed is about 1000 fpm. Bliss supplied the mill with complete entry and delivery equipment – entry coil ramp, mandrel-type payoff reel, coil hoist and positioner, combination pinch roll and flattener, tension reel coil buggy and belt wrapper.

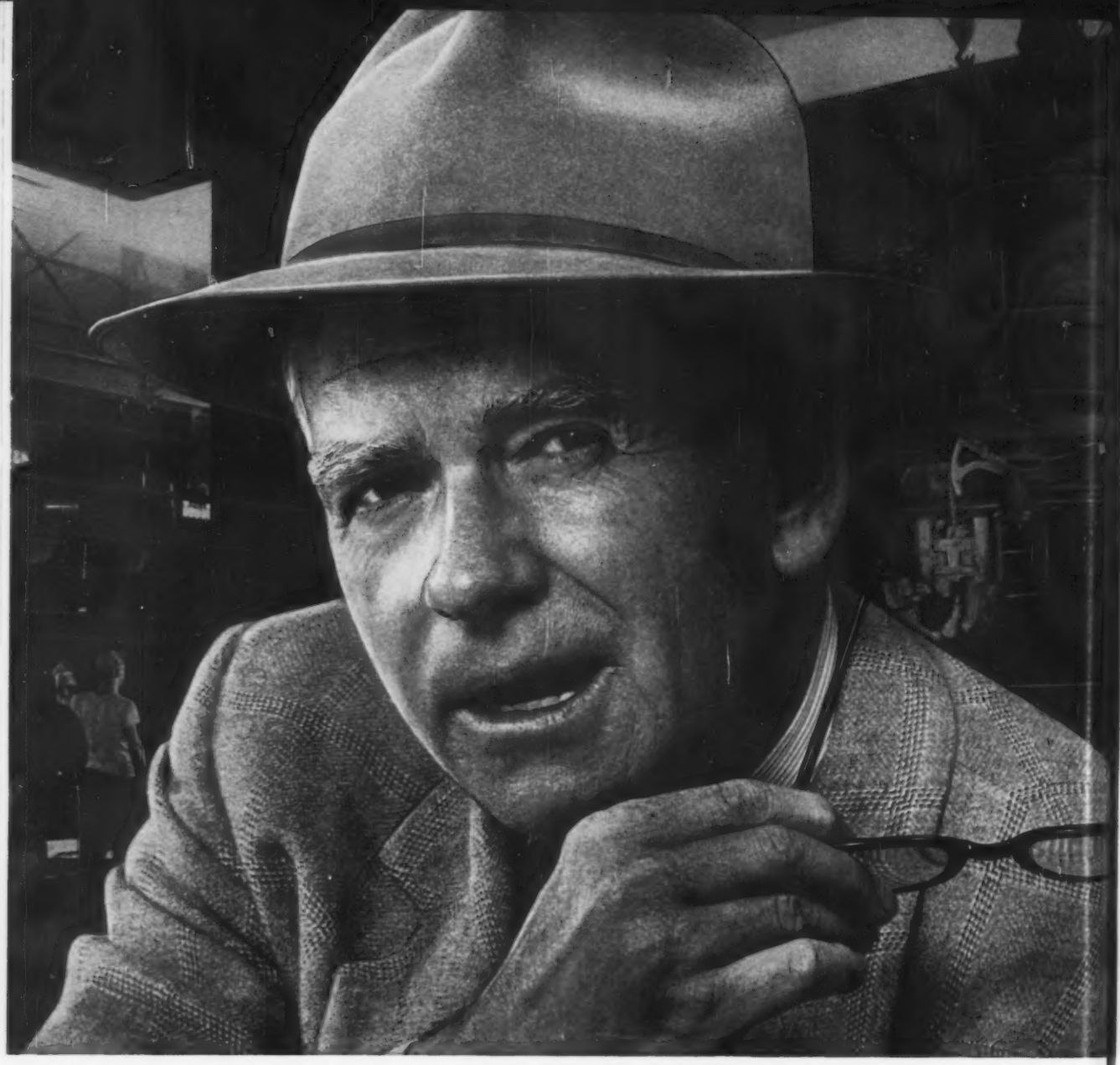
Because, among other reasons, the average number of passes were low in Thompson's case, the one way mill proved a more economical choice than a reversing mill. In other cases, the opposite has been true. For examples of both, and of other Bliss equipment, write for our new 84-page brochure.

BLISS
SINCE 1857

Bliss is more than a name . . . it's a guarantee

E. W. BLISS COMPANY, Rolling Mill Division, Salem, Ohio

Subsidiary: The Matteson Equipment Company, Inc., Poland, Ohio



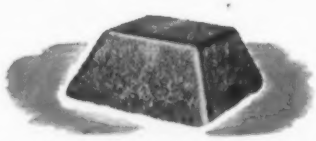
"I stock only one high-carbon chrome—refined chrome"

Steel mill and foundry operators are cutting chromium costs by using the new ELECTROMET refined chrome for all high-carbon chromium additions. Inventory, handling, and storage are greatly simplified by stocking only this one high-carbon chromium alloy. It is ideal for use as:

- **A base charge for stainless steels.**
- **Final additions for aircraft, bearing, and tool steels.**
- **Cupola or ladle additions for cast iron.**

Refined chrome combines the economy of regular charge chrome with the maximum cleanliness and low residual element content of conventional high-carbon ferrochrome. For facts on how refined chrome can reduce your costs, contact your UNION CARBIDE METALS representative.

UNION CARBIDE METALS COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.



Convenient 20- and 40-pound pigs of refined chrome are magnetic, allowing easy handling with an electromagnet.

UNION CARBIDE METALS

***Electromet** Brand Ferroalloys and other Metallurgical Products*

The terms "Electromet" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

FOUNDRY EQUIPMENT MAKERS are enjoying a boom. New orders in February were the highest for any month since November 1950. The pick-up covers a broad cross-section of the industry.

NICKEL USE will approach record amounts this year. International Nickel Co. expects sales to hit 385 million lb. This compares with the record 415 million lb used in 1957.

AUTO MARKET RESEARCHERS are looking into the changing attitudes of car buyers. They expect more motorists to ask "What will it do?" instead of "How does it look?" Demand is growing for light cars and station wagons.

CONGRESS WORRIES about finding more money to keep the roadbuilding program from faltering. Highway use taxes voted in 1956 were supposed to be enough to cover cost of an expanded highway system. But now Congress admits construction will lag unless more money is found soon.

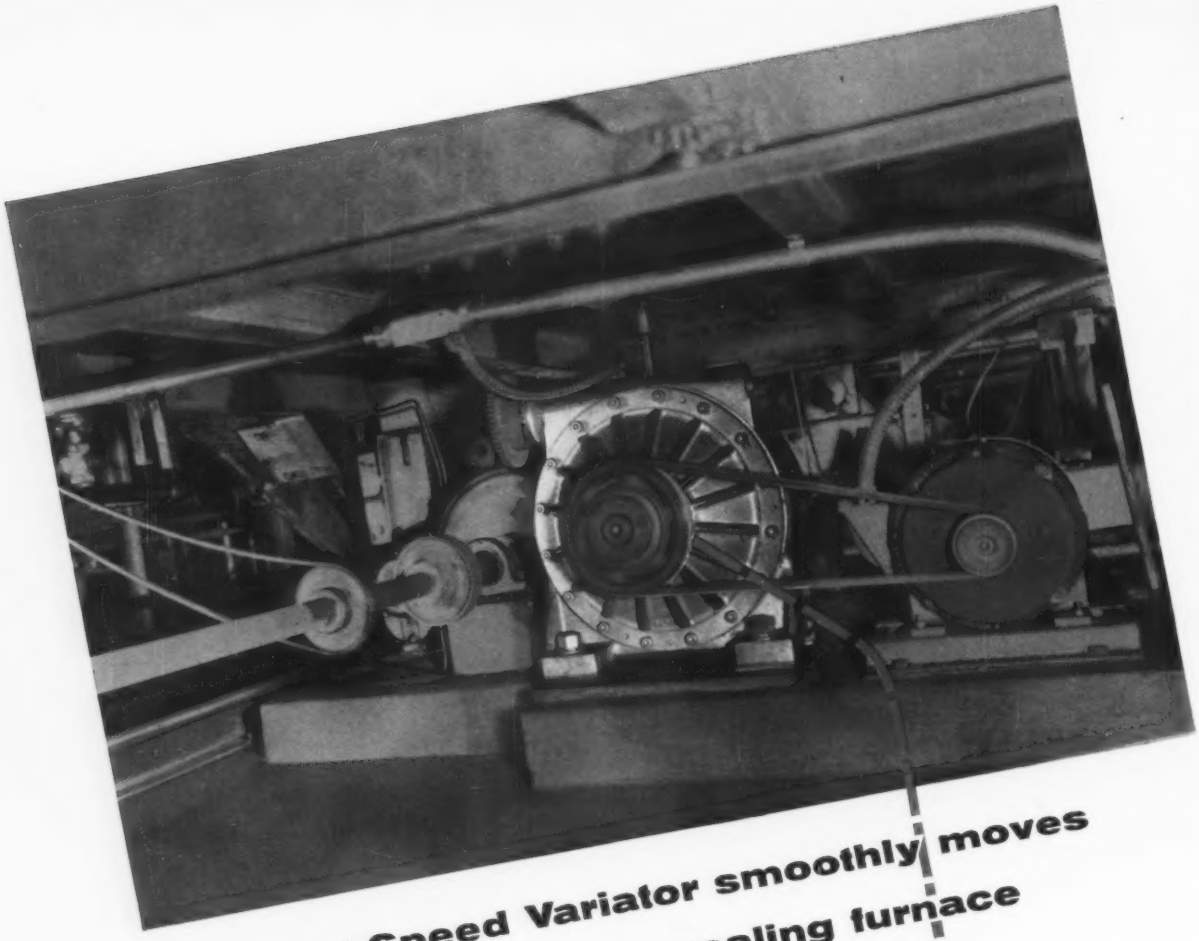
STEEL COMPANIES ARE DEAD SET AGAINST granting a wage rise to their workers. And their mood is so firm that the odds today overwhelmingly favor a strike. But don't ignore the possibility of an eventual settlement that will require a price increase.

DON'T OVERLOOK the effect of a steel strike on construction and capital equipment. The steel mills are planning to spend about $1 billion this year on expansion and modernization. A long strike would, of course, delay completion of these projects.

NEW CONSTRUCTION IN APRIL set a new high of $4.2 billion, according to the Depts. of Labor and Commerce. Work put in place in the January-April period also established a new mark of $15.1 billion. Spending this year is at an annual rate of $54.3 billion.

A NEW PROCESS to build large diameter hose in unlimited lengths without splices has been developed by Goodyear Tire & Rubber Co. Up to now unspliced lengths were limited to 100 feet in diameters up to an inch and a half. Development may stimulate market for special transportation facilities.

PERFORMANCE INCENTIVE PLAN begins to figure in military buying. On the payload of a vehicle, for example, the buying service may set a goal above the minimum. If the contractor exceeds that objective, he earns an extra profit. This plan also allows the service to share in savings made by the contractor.



This Cleveland Speed Variator smoothly moves steel tubes through annealing furnace

A positive, electrically-controlled Cleveland Speed Variator maintains speed of steel tubes passing through this Surface Combustion continuous roller hearth annealing furnace. It drives the furnace's 176 rolls, each 6 feet long by 7 inches in diameter, without any speed fluctuation—that *could* cause uneven annealing, resulting in rejects, lowered production and profits.

Push-button control of the Variator's output speed is easily checked by dial indication showing tube movement.

A dual function is performed by the Variator. It also drives an outlet conveyor, whenever required, through a simple clutch arrangement.

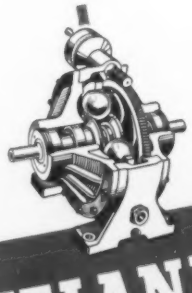
Whenever speed variation is a "must" in your plant, investigate Cleveland Speed Variator. It will pay off in decreased maintenance, improved product quality and output. Send today for your free copy of Bulletin K-200 and get all the facts.

The Cleveland Worm & Gear Company, Speed Variator Division, 3282 East 80th Street, Cleveland 4, Ohio.

Subsidiary of Eaton Manufacturing Company

HOW IT WORKS

Power is transmitted from input shaft to output shaft through alloy steel driving balls which are in pressure contact with discs attached to the two shafts. Relative speeds of the shafts are adjusted by changing the positioning of the axles on which the balls rotate (see cutaway view, right).



CLEVELAND SPEED VARIATOR

Industrial Unions: Are They On the Way Out?

Many unions are not keeping pace with changing technology and industry.

General unions may rise in place of present labor organizations.—By R. O. Schulin.

▪ Are the big industrial unions losing their grip?

In a year when steel production is at an all-time high, membership in the steelworkers union is about 200,000 below peak levels reached in 1955.

Auto production in the first quarter has picked up significantly, but United Auto Workers rolls are 420,000 under the top membership reached in 1953 (see chart).

Power Struggle Coming — These and other examples of declining union membership in the mass-production industries are signs that industrial unions may be on the way out, says Dr. Richard A. Lester, of Princeton University's industrial relations staff.

Here is what he foresees:

1. A power struggle between the major unions is in the making.

2. Industrial and craft unions will be overshadowed by the growth of big "general" unions.

3. These general unions are most likely to grow out of a few craft unions now in existence.

Automation's Impact — "It is highly improbable that blue collar membership in the steel union and the UAW will ever reach the peaks attained in the boom years of 1955 and 1953," Dr. Lester predicts.

Part of the reason for the downhill trend in these unions is the capital improvement programs of the past decade. They are beginning to pay off in automated production.

But Dr. Lester also attributes the decline in industrial union strength to the rigidity of union structure.

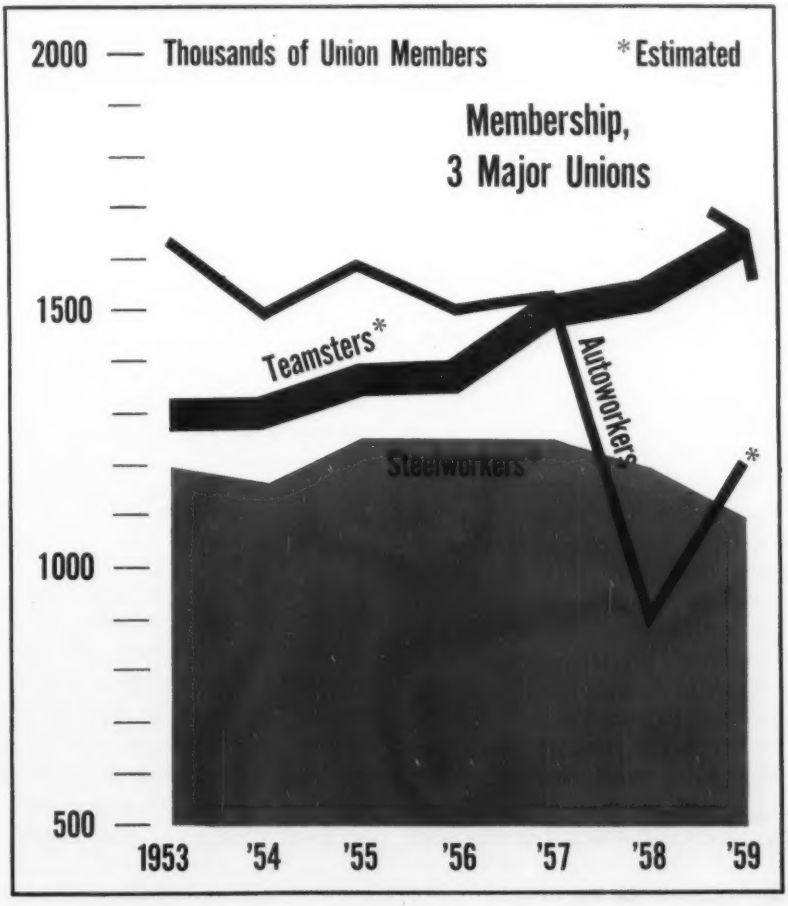
In a Rut—Institutionally, speaking, unions are conservative in nature and resist outside forces pressing for change and readjustment," he explains. "Unions and union-management relations tend to get into ruts. They lack flexibility."

An example of institutional rigidity at its worst, according to Dr. Lester, is the railroad union where incentive systems are based on a so-called "production basis" established before World War I. Railroad managements must deal with what amounts to twenty or more unions.

While the steel and auto unions haven't reached this state of affairs yet, Dr. Lester does see hardening-of-the-arteries setting in.

Unemployment Dilemma—Aside

Changing Union Fortunes



from their own declining membership, the unions are disturbed by the growing percentage of post-recession unemployment. For example, following the recession of 1949-50, unemployment was at 3 pct of the total work force. After the 1954 recession, unemployment was 4.2 pct. With the 1958 recession behind us, unemployment is greater than 4.2 pct in some sectors of industry.

Campaigns by the unions for a shorter work-week in order to increase employment and thus preserve their membership are described by Dr. Lester as "basically unsound."

Featherbedding — "A shorter work-week is all right, normally, but not when it is forced on an industry because of unemployment," he comments. "It is just another form of featherbedding. It does not get at the roots of the real problem —continued economic expansion and absorption of the work force."

Attempts by some unions to restrict use of labor-saving devices and new techniques are also regarded by Dr. Lester as unsound. He considers economically unwise union efforts to prevent management from subcontracting some work.

The British Example — "Since World War II," he says, "American industry has diversified tremendously, while the unions continue to operate along the same narrow lines. Old unions are going to have to adjust to diversification.

"As technology changes and industry diversifies, unions will have to become more general," he explains.

Dr. Lester expects unionism in the U. S. to evolve along the lines of British labor organizations. In England now, three general unions dominate the labor picture. They are the transport workers union, a general and municipal union, and a clerical union.

Conservative but Flexible—Fears voiced in some quarters that general unions tend to become dominated by radicals are not shared by Dr. Lester. England's two biggest unions have conservative leadership on the whole, he points out. The third has some "taint of liberalism."

These unions are very influential. They cover such a broad area of industry that they don't suffer from a membership loss in one particular industry. Consequently, there is no need to resort to the devices of a short work-week, bans on new techniques, and restrictions on subcontracting in order to preserve their membership.

Back to the States—Now comes the question of which unions in the U. S. are most likely to develop into general unions.

Dr. Lester believes the craft unions are more suited to expand along general lines since they are already horizontally organized. He points particularly to the teamsters, the machinists, and the electrical workers unions.

"But a lot depends on whether the AFL-CIO can keep control over the majority of organized labor," he says.

Teamsters Lead—The machinists and the electrical workers, already in the AFL-CIO fold, are suited to general union growth because the skills of their members are especially suited to automation.

The International Brotherhood of Electrical Workers, AFL-CIO, has made notable gains in membership. In other electrical unions and the machinists union, rolls have held relatively steady.

But the outcast Brotherhood of Teamsters is already expanding along general union lines, Dr. Lester notes. It has a considerable head start on the others.

Total teamster enrollment of 1.63 million members makes it the largest single union in the country.

Furthermore, its dominance in the all-important distribution industry makes it a natural for growth along general union lines. Its membership cuts across hundreds of industries.

Saturation Near — Although Dr. Lester foresees a decline in indus-

Industry-Wide Bargaining: Is It Coming?

▪ Banding together by employers into bargaining associations is regarded by many industrial relations authorities as "the coming thing" in union-management negotiations.

Prof. Carroll R. Daugherty, a Northwestern University economist, says industry-wide bargaining by management is necessary to prevent excessive wage and fringe benefit gains by labor.

"If this is done—and the trend in the last 15 years is unmistakably in this direction—then employers' self-interest to control costs . . . can effectively balance the unions' self-interest to get more and more, the more being usually achieved at the expense of the great mass of unorganized consumers and of unorganized producers whose incomes are fixed or rise sluggishly."

To stop excessive wage and fringe benefit increases, he suggests "the proper prescription is the development of relatively equal bargaining power between the two private decision makers, union and management."

"Today a national union in any given industry is considerably stronger than any corporation, however large, in the industry. But surely equality of bargaining strength is not to be achieved by breaking up national unions into their constituent local unions. Any multi-plant corporation is much stronger than any local union in any of its plants."

trial union membership, it doesn't necessarily mean there will be a drop in total union membership.

Dr. Lester does regard the 18 million total as pretty close to the saturation point for organized labor today.

Hindsight—Since 1945, the growth of union membership has kept pace with employment expansion in industry. The U. S. Dept. of Labor reports that a ratio of about one union member for every three employee in non-agricultural establishments has typically prevailed in the post-World War II period.

The Labor Dept. reports:

"The recent stability of this ratio tends to obscure frequent substantial shifts in membership of individual unions.

Between 1951 and 1956, almost half the unions reporting to the Labor Dept. experienced a rise or fall of membership of 15 pct or more."

Outmoded Philosophy—The problem facing many unions today is one of philosophy, says Dr. Lester. American unions are oriented basically in the plant. To prepare for general unionization, they must broaden their outlook.

For industry as a whole, the primary problem is one of continuing economic growth and absorbing the new work force.

Stakes Are High—"Many of us may not be willing to face it, but we are in a struggle for our way of life," warns Dr. Lester. "The Soviets have challenged us to a contest of economic growth.

"Whether industry can meet the challenge depends to a large extent on the ability of labor and management to bargain intelligently, the flexibility of unions, and a constructive attitude by government.

"It means we are entering a critical period in industrial relations."

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Top Steel Changes

▪ Three high-level U. S. Steel Corp. administrators moved up when Clifford F. Hood resigned the company presidency.

Replacing Mr. Hood as president and the Corporation's chief administrative officer is his protege, Walter F. Munford, a 58-year old New Englander whose introduction to the industry was when he worked summers in a wire mill to put himself through college.

Mr. Munford was also elected a director, and chairman of the executive committee.

The Way Up — Prophetically it was at American Steel and Wire Div., that Mr. Munford earned the Hood label, working under the former U. S. Steel president.

And like Mr. Hood, Mr. Munford apprenticed for the Corporation presidency as president of American Steel and Wire.

No Policy Change — Observers note this move emphasizes several Corporation policies. Top officers normally give up their positions at age 65. Mr. Hood will continue to be active as a member of the executive committee and a director.

And the new president is an operating man.

Other Promotions — Filling the spot Mr. Munford left—executive vice president of engineering and research—is Stephen M. Jenks. During his more than 30 years with U. S. Steel Mr. Jenks has earned the reputation as one of the country's top steelmakers. In 1956 he won the Fairless Award of the American Institute of Mining and Metallurgical Engineers for "distinguished achievement in iron and steel production and ferrous metallurgy."

Moving up to vice president and assistant to the president is J. Douglas Darby, formerly administrative vice president—commercial.

Walter F. Munford

Stephen M. Jenks

J. Douglas Darby

Ike a Big Factor in Steel Talks

President's Influence Will Be Felt to Bitter End

Steel labor contract talks are off to a poor start. And they're not likely to improve.

Indications are that no settlement will be reached before the June 30 strike deadline.—By Tom Campbell.

1959's Union-Management Crisis

▪ The monkey wrench President Eisenhower tossed into the steel labor picture is still there. It will stay there and have a definite effect on current collective bargaining at New York City.

There is every indication that there will be no new steel contract by the June 30 deadline. There are reasons to believe it will be some time after June 30 before a contract is signed.

Just Talk—Public talk by steel companies and union representatives that they are exploring, bargaining, and making every attempt to reach an agreement is mere words. Each is digging in with his own points. What may be non-inflationary to Dave McDonald may be inflationary to steel companies.

Steel companies are dead set against any wage cost increases. Their chief negotiator—quiet-speaking R. Conrad Cooper, executive vice president-personnel of U. S. Steel—is the coldest pineapple Dave McDonald has ever come up against. Also, he is a terrific listener.

Assistance Disclosure—The disclosure by The IRON AGE that steel firms were prepared to meet a "divide-and-conquer" union strike technique with a mutual assistance proposal, drew blood—from the union. Union legal counsel Arthur Goldberg's letters demanding investigation of steel firms by the Dept. of Justice and the National Labor Relations Board were overdone. Being overdone, they disclosed an extreme sensitivity and defensiveness not present, so soon, before.

Mr. Cooper's reply suggesting that perhaps the union's concentration of power should be investigated was not buddy-buddy talk. That steel companies have had under consideration the mutual assistance proposal is in itself an indication of how strong the united front is at this early date.

Administration Firm—President Eisenhower's influence is expected to remain in the steel labor picture until a final settlement is made. While he is not expected to inject himself into the fracas in a way which would replace collective bargaining, he or other high Administration officials will bang away at this theme: No steel contract that will cause a steel price increase. That effectively leaves little room for steel firms to move around in.

But steel companies knew after the 1956 contract was signed that the wage-price spiral had to stop. They can be forgiven if they feel disenchanted with the White House. It was side-door pressure from the

What About the 175 Million?

Ike Speaks Up—At his press conference last week, President Eisenhower spoke up for the 175 million Americans who will be affected by the outcome of the steel labor negotiations.

A reporter pointed out to the President that steel labor claims that steel profits are high and that the industry can afford a wage boost without increasing prices.

The President said the question of profits is not too important in the overall picture.

What President Wants—"What is important," he said, "is that there are 175 million Americans involved" in steel wage negotiations. "Their interest may be served, damaged, or possibly advanced by the decisions reached by the employers and employees" in the steel talks. The industry is basic, and what is done affects everyone. We are looking to the negotiators for good sense and "business-labor statesmanship," he said.

Then he backed into the question of whether the government would seek economic controls over prices, wages, and profits by saying that this country "in the long run can't and won't stand still and do nothing" but "I deplore the possibility of putting the government into this field, either as a party to wage negotiations or with laws setting the level of wages, profits, and prices." This would hurt American principles, he said.

We're Affected — The President added that the 175 million people affected ought to make it clear "we're concerned and we're not going to stand outside and see ourselves hurt."

White House which in 1956 helped Dave McDonald get the best steel labor contract in history. It is in the realm of fantasy to believe that the same White House will give such a boost to Dave again this year.

Dave on the Spot—The well-conditioned labor chief is in a spot where equally well-conditioned Mr. Cooper probably hopes he can keep him. Dave has promised to get a better contract than he got in 1956. He needs to get a "good" one if he is to be re-elected union president in 1961. A "poor" contract is not only poor election material, it could be a one-way ticket out of the presidency.

Just what Messrs. Cooper and McDonald can talk about for the next six weeks is a tough one. It only takes a second to say "No." Mr. Cooper has a personal stake in these negotiations. This is his first really big bargaining meeting where he is carrying the ball for 12 steel firms. He must make good at a time and under conditions which may bring both sides to a cold-blooded and hopeless impasse.

Speculation Rife — Dave McDonald could be a hero and settle for a wage freeze. But those who expect him to do this are completely unfamiliar with the requirement of being a labor leader who must produce. Admonition by steel management and steel labor against "unwarranted" speculation is part of the public negotiating now going on at the Roosevelt Hotel in New York. Steel firms and the union—separately—have and will speculate far more actively than will any member of the press.

Steel companies, steel customers, stock market analysts, union officials, the public, and the Administration must speculate on the outcome of the steel labor hassle if they are to be in a position to act promptly if their interests are threatened. It is better that they advance information—or speculation — even though negotiators frown on them.

Odds Still on Strike—There is no reason this week to believe that the President will step in and ask the union not to strike if no agreement is reached on June 30. Nor is there any reason to believe that steel companies will move from their position of "no wage cost increases." There is hardly any reason why Dave McDonald will agree to what union people call a piddling settlement.

All this reflects a 70-30 chance for a long strike with a Taft-Hartley cooling off period likely some time after the strike is called. Steel customers have plenty of steel. It is believed that manufacturers with missile and other defense contracts were among the first to "stock up." On that basis there will hardly be an unbearable emergency in steel supplies much before six or eight weeks after a shutdown—some consumers will be crying for steel before a month is out, but this will not be general.

Even if Dave McDonald does not adopt a divide-and-conquer strategy, about 16 pct of the industry's capacity not organized by the steel workers will be operating. Also, warehouses are loaded, and some smaller firms have contracts running beyond the June 30 deadline—in most cases about 30 days longer.

BEFORE THE BATTLE: R. Conrad Cooper, chief negotiator for steel companies, left, and David J. McDonald, steel labor chief, at start of contract talks. Blunt exchanges marred early give-and-take.

Taft-Hartley Angle—If the Taft-Hartley Act is invoked eventually, the steel industry ought to be able to get a better break from fact-finding panels than it has in past administrations. Mr. Cooper would add to the industry's chances to hold the line against inflationary wage cost increases because he is an expert pleader and negotiator before panels.

It remains to be seen whether the crisis will go that far. But this week the situation was not too promising.

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Founders on a Spending Spree

They're Swamping Equipment Makers With Orders

Foundry business this year has come back stronger than had been expected.

And if things stay this good equipment makers will likely get even more foundry business.—By T. M. Rohan.

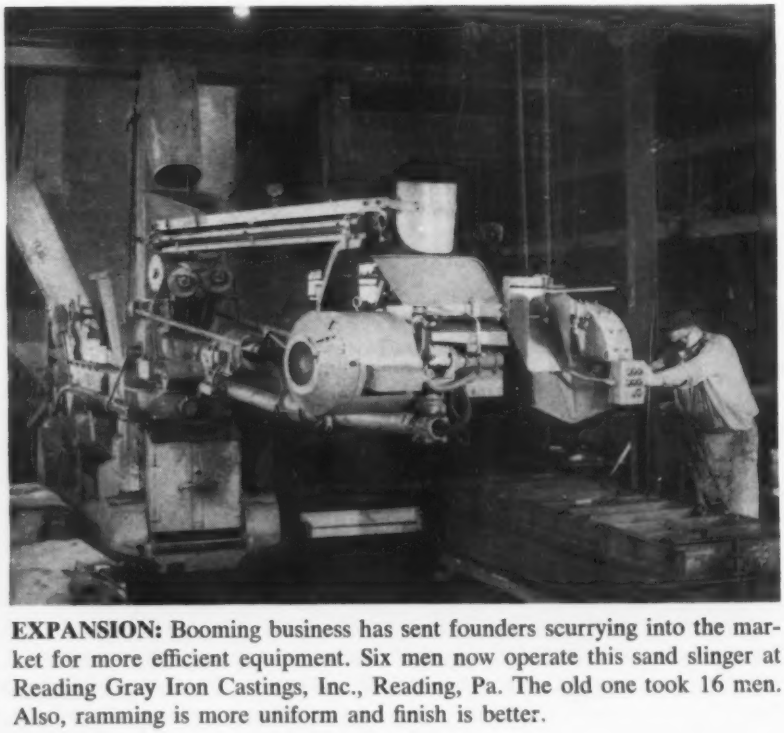
■ Foundries are coming back so strong this year that foundrymen are off on what looks like one of the biggest new equipment buying sprees in years.

Money is burning a hole in their pockets to such an extent that new orders for foundry machines in February were the highest for any month since November 1950, and better than double the average rate of the last five years.

Sharp Upturn—Incoming orders, gathered by the Foundry Equipment Manufacturers Assn., for February jumped to an index figure of 237 from January's 127. Last year's average was only 89. February also tripled the average of the three preceding months.

"Our whole industry is watching the trend, especially the March figure due in a few weeks," says Einar Borsh, FEMA vice president and executive vice president of National Metal Abrasives, Cleveland. "What is amazing is that it is so contrary to the expected trend and came so soon. We are hoping it isn't just a few single whopping orders. If the trend continues, there will be a mad scramble to get shipments out."

Almost all segments showed an increase—blast cleaning and tumbling equipment, dust and fume collectors, molding machines and material handling equipment. The only laggard has been furnaces.



EXPANSION: Booming business has sent founders scurrying into the market for more efficient equipment. Six men now operate this sand slinger at Reading Gray Iron Castings, Inc., Reading, Pa. The old one took 16 men. Also, ramming is more uniform and finish is better.

Backlogs Move Up—Big foundry machine builders like Osborn Mfg. Co., Cleveland, noted their backlogs shot up early this year. At Osborn, Ed Texler, assistant sales manager, said sales in the first quarter this year were about half of all 1958. Deliveries are now into September compared to about two months this time last year.

"And all the foundries want their equipment tomorrow," he said. "We have doubled our engineering department in the last three months, and they are still working a 55-hour week."

Independent gray iron foundries have had two 1-million-ton months in a row this year, in January and February. There wasn't a single of these last year, according to Don Workman, Gray Iron Founders Society executive vice president, Cleveland. Shipments last year were 10,371,232 tons, the lowest since 1946. Prospects are for 12,250,000 tons this year, says Mr. Workman.

Foundry Business—Backlogs for iron foundries are now from three to eight weeks compared to from nothing to a week or so, six months ago. Most are now going five days a week.

Steel foundries have not had quite such a surge because railroads which take 35 pct of shipments are building cars more slowly.

Malleable foundries are operating at over 80 pct of capacity and backlogs are up substantially, according to Lowell Ryan, Malleable Founders Society executive vice president in Cleveland.

Expansions—Here are some of the expansion projects of founders, chiefly gray iron:

In Hamilton, O., the re-named Hamilton Foundry, Inc., is in the midst of a $150,000 expansion which is a part of what ultimately

may be a $1 million long-term program. Hamilton has a new water-cooled, copper-tuyered cupola redesigned from a British type which the firm says permits as close temperature control as an electric furnace. "We have also just completed a new heat treating facility and have started on the office and a new laboratory," says Peter R. Rentschler, vice president.

Neenah Foundry Co., Neenah, Wis., which now has a higher backlog than in all of 1958, recently announced a $1 million plus expansion. A new foundry will double plant capacity. It will include a mechanized sand system, semi-mechanized molding conveyors and sand slingers.

"We saved about 25 pct on buildings and equipment by launching our $250,000 expansion at the bottom of the recession," estimates R. J. Gollmar, vice president of Elyria Foundry Co., Elyria, O.

"We really saw some old-time hustling workmen around here during construction," Mr. Gollmar says. "We had one new sand tank put in identical to one installed two years ago and came out 25 pct lower than the older one."

Mr. Gollmar revealed, "We also have authorized a consulting firm to check our system here and may make further improvements in balancing out the operation based depending on what they tell us."

Steel Foundry Plans — Steel foundries too have been on the move. New buildings and equipment have been or are being put in by Pelton Steel Castings Co., Milwaukee; Texas Electric Steel Castings Co. of Houston; K. O. Steel Casting Co. of San Antonio; Ohio Steel Foundry Co. of Springfield and Lima, and Locomotive Finished Material Co. at Atchison, Kan.

Vulcan Steel Foundry Co. of Oakland, Calif., has also installed new melting facilities. Electric Steel Casting Co. of Portland, Ore., has put up a large new foundry at Vancouver, B. C.

Bonnly Floyd Co., of Columbus, O., has installed a betatron inspection unit and other production units.

Nickel Outlook Good

Sales May Be 20 Pct. Over 1958

International Nickel's sales vice president Gagnebin says producers are getting ready for a buying boom.

He predicts world consumption this year will top 385 million lb, compared to 320 million lb used in 1958.

▪ Worried frowns have changed to smiles in the nickel industry. Business so far this year is running ahead of 1958's poor levels. The market outlook is bright.

"Nickel sales in 1959 should run 20 pct above last year," reports A. P. Gagnebin, International Nickel Co.'s vice-president, nickel sales. Customer inventories of 48-50 million lb at the beginning of 1958 were worked down to perhaps 30 million lb at the start of this year, replenishment, plus higher operating rates by several major consumers, is boosting orders.

Estimated Free World nickel consumption in 1958 was about 320 million lb, or 95 million lb less than the record year of 1957. Consumption this year should run about 385 million lb, and may do even better.

Ready For Boom — Producers are ready for the boom. This year, Free-World capacity should be about 550 million lb, rise to 650 million lb by 1961. (Inco will account for 385 million lb, or about 60 pct of the 1961 total.

In the United States and elsewhere, the steel industry continues to be the single best nickel customer. Last year, stainless steel producers accounted for about 28 pct of all nickel sales and engineering alloy steels another 16 pct. American steel companies are continuing to buy at a good clip, and Inco is optimistic about the third and fourth quarters, with or without a steel strike.

Stainless Outlook Good — Optimism is based on bright outlook for both stainless and alloy steels. Even if stainless does no better than follow its historic pattern of doubling production every 10 years (and it may exceed this growth rate), it will remain a good customer. Engineering alloy steels have always depended heavily on nickel for their properties. And Inco notes a tendency to upgrade steel specifications in many cases. Designers are returning to such grades as 4600 and 4800 now that they are in good supply. "This is how history can help you," smiles Mr. Gagnebin.

Missile Uses—Alloys with 5 to 9 pct nickel are finding increasing use in low-temperature applications, such as tanks and pressure vessels for missile-age materials like liquid oxygen, nitrogen and propane. At the other end of the thermometer, the continued trend to higher pressures and temperatures, especially in motive-power equipment, is sending new business to nickel companies. Super-charged diesels are a good illustration. Early efforts at super-charging often resulted in component failure at elevated temperature-pressure conditions. As a result, new designs call for alloys considerably richer in nickel.

Nickel alloy specialties share the No. 2 market spot with alloy steels —16 pct of total sales. The long term potential looks good. Super alloys, with high temperature resistance, have been pretty well limited to defense work, but they'll be moving more and more into civilian markets.

Barter: An Economic Weapon?

It's Slow Going, But the Trend Is That Way

Agriculture Dept. says the rules don't leave room to take on the USSR in economic war.

But the pressure is building up in Washington to change all that. —By F. J. Starin.

▪ Lots of people would like to turn the U. S. barter program into a big gun against Soviet economic aggression. But few, if any of them, are with Commodity Credit Corp., arm of the Agriculture Dept. which is running this show.

It looks like enough pressure is building up to move barter into the ranks as an economic weapon. But it is building slowly, and there are problems.

Nothing will likely happen very soon,unless a dramatic Soviet victory prompts some crash action.

Here's the picture:

The main function of barter now is to unload surplus U. S. farm perishables overseas, for commodities we can use in national defense, usually minerals and metals which aren't so perishable. It works. But the problems crop up in the small print. For example, CCC can accept only materials specified by the President, on recommendation of an Interagency board. It is limited to what we can not produce in adequate quantities. This has already ruled out several zirconium offers even though the metal taken in barter doesn't add to the domestic supply because it never hits the market.

We Lose in Austria—Also, Austria could use some of our extra food. And the country is dangerously close to the Soviet sphere. But Austria hasn't got much we can take under current barter rules. She would like to unload some surplus ferrotungsten, but that's not on our shopping list. Result: Russia is picking up the marbles.

Another problem: The rules say a barter deal must not replace a cash sale. So contractors must prove this "additionality" to CCC. This almost categorically eliminates some possibilities.

W. Germany, for instance, is a regular buyer of wheat from the U. S. But she has plenty of hard currency to pay for what she wants, so it is just about impossible to barter wheat to W. Germany.

In some cases proof takes time. Early in March Rep. Harold Cooley (D., N. C.), chairman of the House Agriculture Committee, pointed out that a swap of U. S. wheat for Indian ferromanganese recently completed had originally been proposed in August 1957.

Advantages—Actually, this is not all one way. A CCC spokesman estimates it is now pondering about three times as many proposals from barter contractors as last year.

And there are cases where "additionality" didn't hurt and may have helped. U. S. cotton is thoroughly underbid on world markets. So CCC figures any deal for cotton must be "in addition."

The CCC people are well aware of the seriousness of the Soviet threat. They are in close contact with U. S. embassies around the world. And they even cooperate independently with foreign agencies.

To Make Them Fight—But they say their function is to unload surplus farm products, and to balance the books doing it. To engage in economic warfare they would need a subsidy.

The feeling at CCC is that mechanism exists to convert the program. It's just a matter of someone high up enough making up his mind. CCC won't switch unless it is told.

Do Barter Rules Help Russia?

For It—Advocates of barter as an economic weapon are making a strong case.

Their leader in the House is Rep. Harold Cooley (D., N. C.), chairman of the Agriculture Committee. Here is what he told Congress:

"Mr. Speaker, we all know that the Soviet bloc is mounting an economic offensive against the free world. Part of this campaign is to displace U. S. exports to other free world countries. The Congress has handed our own Dept. of Agriculture an effective weapon to counterbalance and offset this Communist economic strategy. It is the barter program under Public Law 480.

"Hostile forces within the Administration arbitrarily curtailed the barter program. . . .

We Lose—"As an example of the continuing seriousness of this situation, during the past two months five barter proposals which would involve exports of surplus commodities to Belgium have been vetoed, although Belgium has entered agreements with Communist-bloc countries for the purchase during this year of 372,000 metric tons of those same farm commodities.

"Whose cash markets are we protecting?"

How New Service Center Pricing Works

Under the new warehouse pricing system the big difference to customers is on multiple item orders. Previously a user ordering 6000 lb made up of different, small quantity items got the same discount as the buyer taking 6000 lb of the same item.

Formerly there was a spread of $11.50 in order quantity discounts. The new method has a spread of only 75 cents in order quantity differentials. Before item quantity made no difference. Now there are 10 different item quantity brackets starting under 100 lb and going up to 10,000 lb and over. In addition there is a schedule of order quantity differentials. (See p. 204.)

Here are examples of how the system revises pricing:

Product	Former Price	New Price
Plates, 1 ft sq., 3/8 in. thick (309 lb)	$ 17.94 per cwt	$ 15.83
H-R Bars, 5 in. squares (1795 lb)	10.24 per cwt	10.55
Plates, 5/8 in. x 48 in. wide (8 ft long—9938 lb)	8.54 per cwt	8.09
Combined order of 17 items averaging 200-300 lb (Total of 6216 lb)	597.15	771.86

Service Centers Revamp Pricing

▪ Steel service centers have revamped their pricing to tie it more closely to costs.

At the same time the new pricing arrangement can provide savings for the careful steel buyer.

The new system was first announced in Pittsburgh last week by Joseph T. Ryerson & Son. It is expected to spread to other cities.

Seller Benefits—In discussing the move distributors there point out it costs them more to process an order of 17 different items than one single item of the same total weight. In addition stock turnover is an important factor. Slow moving items are more expensive to handle than more popular ones.

Buyer Benefits—Ryerson, in a letter to customers, comments, "A sound price structure recognizes the variation in handling costs between small and large items. The buyer who combines his purchases by careful planning is entitled to the reward of a discount based on the total size of the order, and corresponding to our reduced costs for assembling, shipping, and billing."

The shrewd buyer can spot savings by boosting order size. He can still group several items into a single purchase order to boost the weight of the total order. But he may now find it more profitable to boost the quantity of any one item within that order. Total order weight still counts, but the weight of each item counts more.

Combine or Not?—For example, under the new pricing, a buyer who buys an average of 2000 lb of an item might save an average $15 per 1000 lb, even without combining the items into a single order to take advantage of order quantity extras.

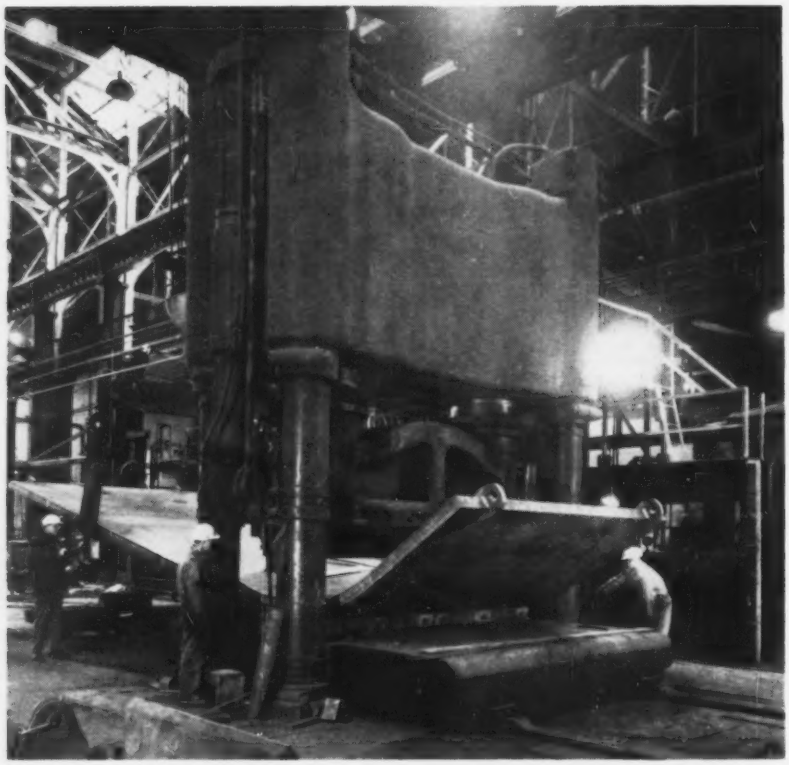
Ryerson is cautious about pushing the economies possible under the new system. But they exist and Pittsburgh purchasing agents are already spotting them.

New vs Old—In one instance, 2000 lb of standard 3 in. beam cost $211 under the old system. Under the new system it costs $195.80. Or 1000 lb of 2x2x¼ angle would cost $112.90 under previous pricing; $96.10 under the new system.

On the other hand, small quantity buying of an item will boost its cost. For example, 200 lb of ½x2 flat HR bar would cost $22.48 under the old pricing; $29.40 under the new system.

Systems of net pricing based on turnover appeared first at Portland (see The IRON AGE, p. 60 March 20, 1958), where U. S. Supply Company installed a net price system. Turnover net pricing has since appeared at Minneapolis and Boston. Steel service center operators have tested it in a number of other cities, but only on a handful of products, usually cold finished bar.

Steel Plate Is Bent to Shape



SAY WHEN: This 38-ft long, 5-in. steel plate will be curled by the 6000-ton bending press until it is semi-circular with an 8½ ft radius. Five of these end-to-end will make the cover for a pit housing steam turbine rotor-testing facilities at a General Electric plant at Schenectady, N. Y. The steel is worked at Bethlehem Steel Co., Bethlehem, Pa.

Republic Expansion

A major steelmaking and finishing capacity expansion of Republic Steel's Warren, O., mill is in the works. It will probably involve a new wider sheet mill, some oxygen steelmaking capacity, and possibly a blast furnace. Estimates run at least $50-60 million, without the blast furnace.

Official announcement is expected momentarily.

Certain to be installed is a semi-continuous strip mill for alloy and stainless, similar to those installed recently by Armco at Butler, Pa. They run over $25 million, plus heating facilities.

Other Possibilities—Some wider sheet capacity may also be installed. The Warren mill now turns out cold rolled sheet 42 in. wide. Additional capacity in widths to about 58 in. would probably find a ready market in Northeastern Ohio's expanding auto stamping plants.

Steel Mill Shipments

Finished steel mill products shipped during March totaled 8,117,688 net tons, second only to the monthly record of more than 8.3 million set during March 1956, reports the American Iron and Steel Institute.

Direct mill shipments in March to the automotive industry, was a record, 1,761,521 net tons. That was 267,000 tons above the February figure. The former record was 1,679,200 net tons, during March 1955.

Makers of electrical machinery and equipment also received record shipments during March 1959, a total of 250,394 net tons, up 28 per cent from February.

Records were set in the shipments of three major kinds of sheet steel: Hot rolled sheets—927,506 net tons; cold rolled sheets—1,557,042 net tons; and galvanized sheets—311,961 net tons.

Buyers Report

Better production this month is reported by 56 pct of the purchasing agents surveyed by the National Assn. of Purchasing Agents.

Only 3 pct indicate production decreases. Forty-one pct say there is no change. New orders are reassuring, says NAPA. Higher new bookings this month are reported by 53 pct, 35 pct show no change, and only 12 pct have a poorer position.

There is almost unanimous agreement that part of the current production of many items is going into inventory for strike protection purposes, says NAPA. But the inventory buildup has not reached planned levels because of increased output.

Service Center Officers

George L. Stewart, Indianapolis, has been elected president of the American Steel Warehouse Assn. Stewart is president of the Steel Warehouse Div., of Jones and Laughlin Steel Corp.

Chairman of the assn. executive committee is C. L. Hardy, Chicago, president of Joseph T. Ryerson & Son., Inc.

Robert G. Welch, Cleveland, was re-elected executive vice president.

Other officers, elected at the recent annual meeting, include: Vice presidents — W. R. Winter, Minneapolis, Williams Hardware Co.; and William F. Colclough, Cincinnati Steel Products Co.

Ralph W. Shaw, Jr., Lyndhurst, N. J., A. R. Purdy Co., is treasurer.

New Brainard Safe-Ty HiFlex STRAP

New heavy duty strapping–
Lighter gauge–Just as strong–
More feet per pound–
More package conformity

After exhaustive testing in Sharon Steel laboratories, Brainard offers heavy duty strapping customers a new .031 cold-rolled strap to supplement its heavy duty strapping line. We call it "HiFlex"!

HiFlex features superior flexibility for better package conformity . . . gives more feet per pound . . . handles easier . . . faster. Now available along with .035 in ¾" and 1¼" sizes.

This typical advance in heavy-duty strapping is why we continue to say, "Brainard is the strapping industry's most rapidly expanding line."

Brainard representatives are available for consultation. Call or write for a sample —we'll be there!

DIVISION OF SHARON STEEL CORP • WARREN, OHIO

BRAINARD Safe-Ty STRAPPING

In Canada: Brainard Steel, Canadian Division, Toronto, Montreal

MAKERS OF TENSIONAL, HEAVY DUTY STRAPPING. SEALS, ACCESSORIES, TOOLS FOR CARLOADING AND PACKAGING

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Nut-in-a-cage eliminates welding or staking... **SPEED GRIPS**® hold themselves on panels!

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SPEED GRIPS are available in a wide range of sizes and types, including front-mounting nut and bolt retainers for hard-to-reach or blind locations.

See your Sweet's Product Design File, section 8-T for data on these and other SPEED NUT Brand Fasteners. Your Tinnerman representative has complete information and samples. If he isn't listed under "Fasteners" in your Yellow Pages, write to:

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Dept. 12 • P.O. Box 6688 • Cleveland 1, Ohio

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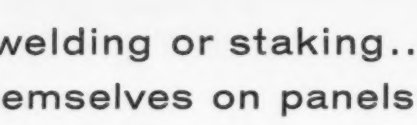

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Charles L. Huston, Jr.

Man Behind Lukens' Expansion

Lukens Steel Co. is adding a new chapter to its 150-year-old growth story.

Mr. Huston sees continued corporate expansion as industry's major challenge.

In the 10 years that Charles Lukens Huston, Jr. has been president of Lukens Steel Co., the company's net worth has more than doubled. It climbed from $19.5 million in 1949 to $43.3 million in 1958.

This period of growth was no hit-or-miss proposition. It was planned and executed under the direction of a man who has been familiar with steel mill operations since boyhood.

Running a steel company might even be called hereditary with Mr. Huston. He is a descendant of the founder of 150-year-old Lukens Steel, Coatesville, Pa., the oldest independent steel company in the U. S.

CHARLES L. HUSTON, JR.: Planning to compete in times to come.

It Meant Work—Apparently, he also inherited a willingness to work hard and burn the midnight oil when necessary.

Born 53 years ago in Coatesville, Mr. Huston was graduated from Princeton University in 1928. He attended Massachusetts Institute of Technology for a year.

Out of school, Mr. Huston left the Coatesville homestead to learn how steel mills were managed elsewhere. He joined Armco Steel Corp., Middletown, O. For 10 years he worked at Armco, first as metallurgical assistant, then as a standard practice instructor, and on the personnel relations staff. He went to night school for two years at the University of Cincinnati.

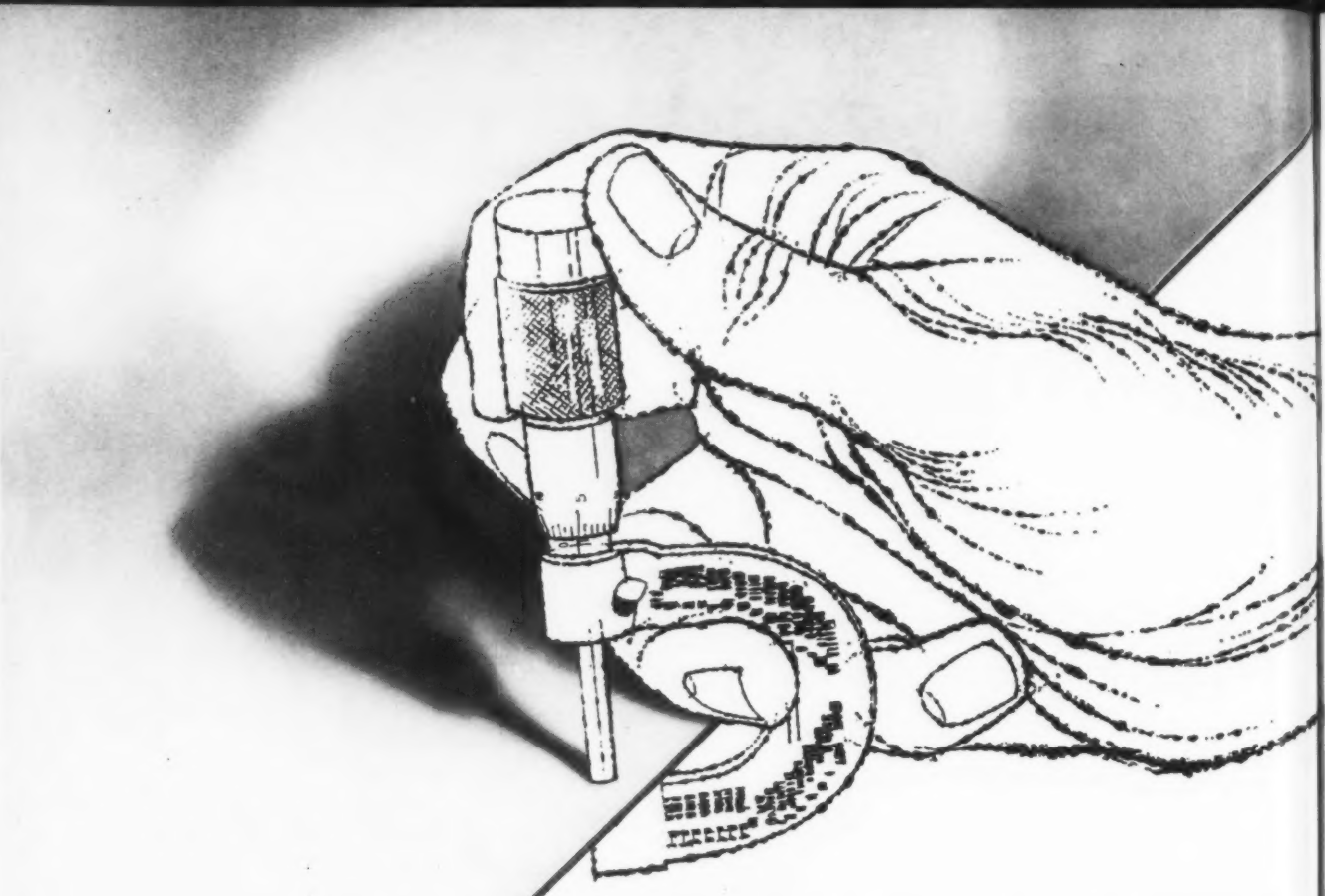
Back Home — In 1939, Mr. Huston returned to Coatesville and started out as director of personnel relations with Lukens. He worked his way up through management until elected president in 1949.

No rubber stamp executive, Mr. Huston keeps close to sales and production problems. He makes frequent personal visits to customers and district sales offices. He makes it a point to visit the shops at least once a week.

Mr. Huston believes it is more important now than ever before that management keep alert to new ideas, new processes, and products. "Private enterprise is moving into an era that will be more challenging than anything in the past," he predicts. "Continued corporate progress, and in some cases existence itself, will demand nothing short of the highest type of cooperative effort."

Management's Duty — He adds that corporations, partnerships, and individual enterprises, regardless of size, have the need in common to generate and re-invest sufficient funds in order to survive competitively and grow in keeping with the national trend.

Mr. Huston, the record shows, gives more than lip service to these principles. At the moment, Lukens is putting the finishing touches on a $33 million expansion program.



J&L COLD ROLLED SPRING STEELS... PRECISION INSIDE AND OUTSIDE

INSIDE—Microstructure control through processing techniques developed by J&L offers important advantages. For example, improved stamping, forming and drawing qualities; uniform response to heat treatment; reduction of heat treating distortion. This product is available in various internal structures and is also available in all hardness ranges—dead soft, intermediate and spring tempers.

OUTSIDE—Superior gauge accuracy of J&L precision spring steels made possible by specially developed rolling mill equipment and techniques, saves production dollars. For example, elimination of grinding for gauge accuracy; lower inspection costs; longer tool life; smoother surface finishes.

Investigate the cost-saving possibilities offered by J&L cold rolled spring steels. Contact J&L Stainless and Strip Division, Youngstown 1, Ohio.

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Summer: A Time for Decisions

Up to now, most executives have met the problems of the recovery with short-term measures.

When the steel labor crisis is settled, it will be time to make plans based on the long-term outlook.

▪ This may be one of those summers when you will find it tough to get away for that vacation, however much you may need it.

It's likely that there will be a seasonal lull in overall sales and production. But that doesn't mean there will be a seasonal lull in executive decisions.

Steel First — First and of immediate importance, no metalworking company can escape the effects of the steel labor battle, fast approaching a climax. Even if your company is not on the front line in negotiations, the steel labor crisis will result in executive headaches.

The problem of gaging inventories against the possibility of a strike has to be met. If there is a strike, it will pose major problems for every steel user. If there isn't, what will be done about inventories?

Time for Decision — And, although steel makers are determined to avoid a price increase if at all possible, you can't dismiss the possibility of a steel price hike this July.

But even without a steel labor crisis, the third quarter looms as a time for decision in other areas of business. Up to now, most companies have taken the recovery in stride as a short-term thing. Now, they are faced with the necessity of long-term decisions.

Recovery Undersold—Very few businessmen had any remote idea that business would reach its present levels before 1960. For a time, they dismissed the rise in indexes as due principally to the steel boom. And that, they believed was based almost entirely on strike hedging.

But in recent weeks there is less and less talk about "water" in the economy. Most producers of consumer durables have had to revise their production rates upward at a time when their best forecasts had indicated a leveling off. Even makers of capital goods are surprised at the revived interest industry is showing plant equipment.

Don't Wait Too Long—A few months ago, most businessmen took a "wait and see" attitude as the recovery picked up momentum. There is no doubt that "water" was present in the economy then and that there was an artificial element in the recovery.

But today more and more executives believe the "wait and see" period is over and the time is fast approaching when new long-range plans must be made.

Employment Rises, But Slowly

▪ One result of the continued improvement in business is a slow, but apparent, improvement in the employment picture.

Significant pockets of unemployment still exist and are not likely to be relieved by general business gains. They are caused by changing patterns in industry, and only to a lesser extent by the business cycle.

Vested interests in a specific industry through pensions and union seniority or in the community through home investment have made workers much less mobile. What labor migrations that have occurred have been to industrial areas that already have unemployment problems.

More Quits—But Dept. of Labor figures show significant gains in hirings and in quits. Incidentally, quit rate is one of the best indicators of availability of jobs. In March, for example, total hirings exceeded total separations by the "comparatively large" amount of 9 per 1000, the Dept. of Labor reports.

One of the factors holding back employment has been the uncertainty of many employers. They hesitate to take back or hire workers that might have to be laid off a few months hence.

It's not likely that there will be a major change in the employment picture until autumn, although many employers will take a new look at their labor forces when the steel labor settlement is reached.

Exports Pick Up

Exports of U. S. products picked up in March but are well below the year-ago level. This reflects the increased hard going of American goods in world markets.

However, March exports showed a gain of 14 pct over February. All of the gain was concentrated in finished manufacturers, which rose from $803 to $918 million.

Exports of manufactured products in March of 1958 totaled $981.1 million.

BULLARD

"H.B.M., Model 75 is better than any other machine we've ever seen."

This statement by Mr. John Gruber, Plant Foreman of George Hantscho and Company, Inc., Mount Vernon, New York, manufacturers of printing equipment, sums up their experience since installing the Bullard 4" H.B.M., Model 75, in June 1957.

He further states "our presses and paperfolding machines are made to order and each job varies from the one before it. Because of this, we can't use assembly line or mass production techniques."

"The only mass production we have is the machining of holes in cast iron, up to as many as 105 in a side frame. Since we've been using our Bullard H.B.M., Model 75, with BULLARD AUTOMATIC POSITIONING we have not spoiled a single piece due to the malfunctioning of the machine."

Do you know the full story on the Bullard H.B.M., Model 75? If not, it will pay you to call your nearest Bullard Sales Engineer — he'll be glad to give you all the details or write

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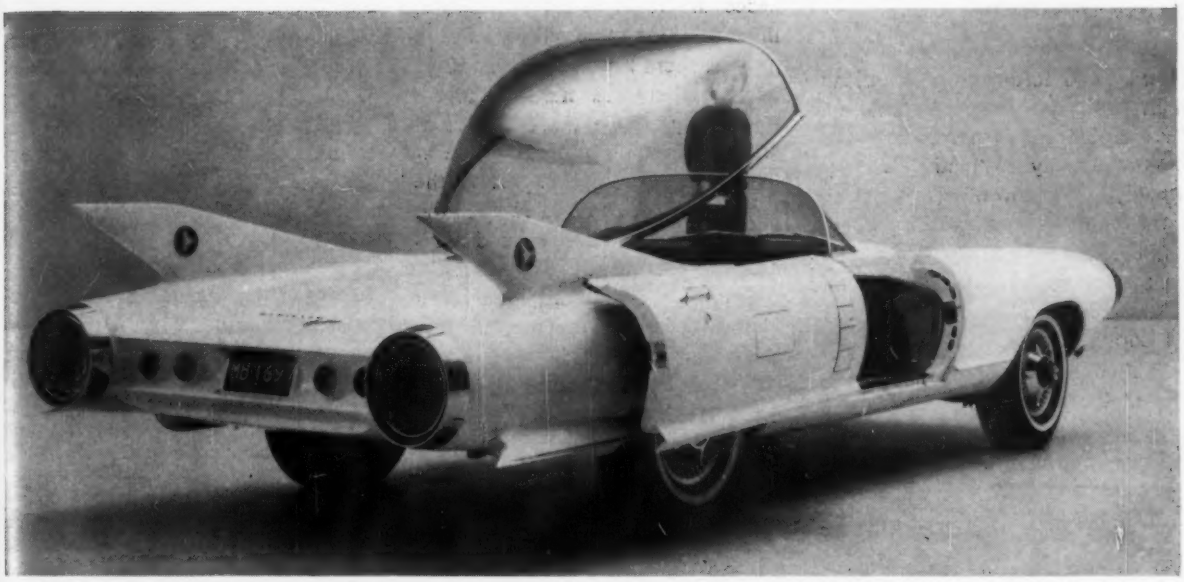

CADILLAC CYCLONE: General Motors' newest experimental car has features that may someday be used in production cars. These include sliding doors, built-in radar, bubble-top domes, and retractible headlights.

Are Car Buyers Coming of Age?

Market researchers expect more car buyers will be asking "What will it do?" instead of "How does it look?"

Demand grows for light cars, station wagons.—By H. R. Neal.

▪ What's around the corner and over the horizon in the way of automotive transportation? And who, what, and how will this be determined?

Three experts — an engineer, a stylist and a market researcher—tackled these questions at a meeting of the Detroit Chapter of the Society of Automotive Engineers. The consensus: Automobiles will continue to undergo regular changes in both styling and engineering to provide products suited "to the dynamically changing consumer way of life."

Forecasting Is Vital—An example of "dynamic change" is the relatively rapid rise in popularity of smaller cars—a trend that started even before the trend to larger and larger cars had reached its peak.

With engineers and stylists working three years and more in advance of the introduction of new cars, it's important to learn well in advance—and to predict, if possible—what kind of transportation will attract customers in the future.

But Forecasters Need Tools—This has created the need for market research—a tool to augment and assist stylists and engineers in providing products acceptable to future buyers.

"Tomorrow's automobile must meet the needs of the individual family member with his individual purposes," says Herb Fisher, director of consumer research for Chrysler Corp. "The requirement is for cars functionally adapted to meet the needs of individuals with individual purposes in mind."

The Horizontal Approach—This calls for re-evaluating the historic viewpoint that automobiles are "aligned along a hierarchy of social prestige," and that the consumer "steps-up" along the scale, differentiating himself by going from a lower to a higher priced car.

As this market expert sees it, the verticle "step-up" scale will be crisscrossed by a "horizontal scale of functional value" with a wider variety of cars designed for different purposes.

Some Examples — On this new scale he visualizes a category of cars designed for only two adults and a couple of small children; another might be a four-adult passenger car designed for lowest cost, but capable of being fitted with more power and deluxe accessories; commercial and station wagon versions of these would provide utility.

But these, he said, would only

augment and not replace the present larger six-passenger cars and luxury vehicles.

Seeds Are Sown—In an obvious reference to forthcoming American light cars, he asserted that the "seeds of this new horizontal scale of functionally distinctive cars is already well sown." (Last week Ford Motor Co. announced it would build parts for its light car in Detroit, but assemble it elsewhere. First assembly plant: Ford's newest at Lorain, O.)

Although refusing to concede the end of the automobile as a symbol of social status, Mr. Fisher challenged designers to throw greater emphasis on functional values.

Too Early to Harvest?—He explained the goal of consumer research is to provide reliable data for decision making. He admits this isn't easy. It requires more than asking what the customer says he wants today or tomorrow. It's more a case of interpreting what is said into what is meant.

Replying to Mr. Fisher, Eugene Bordinat, chief stylist for Ford Motor Co.'s M-E-L division conceded the value of market analysis in establishing trends. But, he said, there is room for doubt in the engineer's and stylist's mind "as to the infallibility of the market research analyst's probing into the future at this time." And he expressed the fear that "it will be looked upon too soon as a substitute for sound management judgment."

Styling "is and will remain a vitally important factor in car sales," he asserted, but not by itself. To be successful, it must still be supported by proper product planning, excellent quality, and practical engineering innovation.

In the Short Run—As a stylist, Mr. Bordinat must consider two futures. In the "immediate" future he foresees that "the public will continue to expect annual styling change—significant change." But "really significant changes" will be possible only through "drastic changes in a car's anatomy."

He, too, believes more specialized cars will be available in the near future. These include not only the small and light cars, but station wagons as a line apart from other cars, and the "personal car . . . with its ego-satisfying and prestige factors."

In the Long Run—The "future-future" could contain any number of changes, "in the light of today's scientific discoveries." Already gas turbine power plants seem mundane.

He prefers to think of a compact, nuclear power source that could be converted into steam or electrical energy, wheelless vehicles riding a thin cushion of air, flying vehicles, and electronically guided vehicles.

The Importance of Style—Buick chief engineer Oliver K. Kelley says the engineer's role is to sense the public need and find ways to bring into being new mechanical aids. In the future as in the past he must constantly improve his product, bring down cost, and broaden the market.

"We live in a highly civilized country," he declared, "where the appearance of our cars . . . is almost as important as the appearance of our clothing. When clothes become old fashioned we discard them . . . this is true of our cars, too."

Automotive Production

WEEK ENDING	CARS	TRUCKS
May 9, 1959*	137,215	26,551
May 2, 1959	118,059	26,148
May 10, 1958	78,506	17,438
May 3, 1958	78,434	17,817
TO DATE 1959	2,343,326	455,212
TO DATE 1958	1,664,407	325,589

*Preliminary Source: Ward's Reports

The Bull of the Woods

TH' PATENTS IS APPLIED FER, SO NOW I AIN'T AFRAID TO DEMONSTRATE MY PICK IN PUBLIC--OBSERVE THERE'S NO BACK BENDIN', AND ALSO---
HE'S INVENTED A SELF-BENDING PICK, BUT I THINK HE'S A LITTLE LATE--PICKS HAVE KINDA GONE OUT O' STYLE--THEY GOT MACHINES FER THAT NOW--I THINK HE'S A LITTLE DIZZY, DON'T YOU?
NO, HE'S IN THE SAME FIX AS TH' REST OF US--IT'S CALLED PROGRESS! I JUST LEARN ABOUT HALF THE TRAFFIC RULES AN' THEY CHANGE 'EM--YOU CAN'T BEAT PROGRESS--YOU'LL ALWAYS BE A DAY LATE AN' A DOLLAR SHORT!
HEY, TH' LIGHT'S CHANGED
T.M. Reg. U.S. Pat. Off. © 1959 by NEA Service, Inc.

Auto Sales Climb

Automakers first quarter dollar sales were up $1.2 billion over the same three months of 1958—a substantial increase of 28 pct. Unit sales of vehicles were also up 28 pct. And profits for the quarter were a hefty 188 pct over the same 1958 period.

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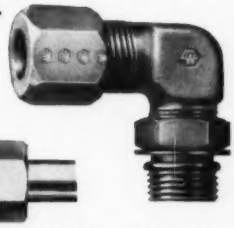

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FOR FLARE TUBE SYSTEMS

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2-Piece Type

No Threading
No Welding
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Carbon Steel
Stainless Steel
Cadmium Plated
Weathercoted

Standard Sizes: ⅛" through 2". Pressure Ratings: 2500 p.s.i. to 10,000 p.s.i. depending on O. D. of tube.

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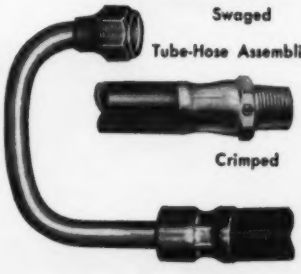

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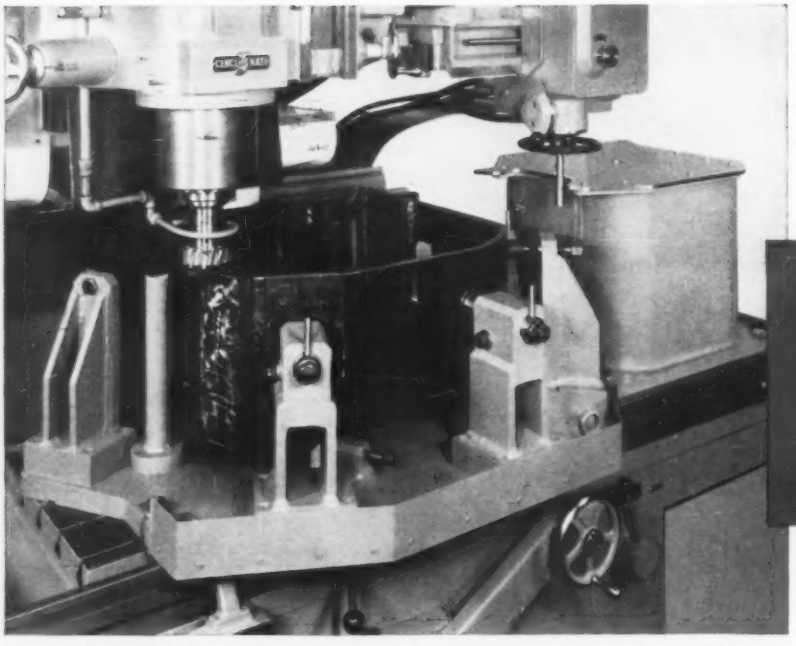
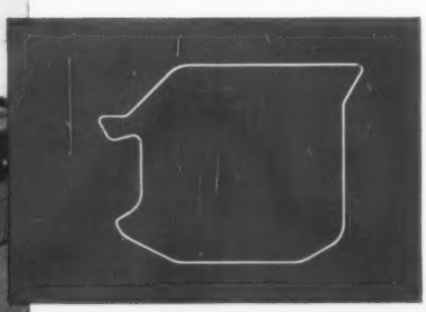
Equipped for Automatic 360° Profile Milling



Entire profile edge of large weldment is automatically milled in one continuous cut, on this CINCINNATI 28" Vertical Hydro-Tel Milling Machine, equipped for 360° Automatic Profile Milling. Note how machine handwheels can be swiveled out of the way to accommodate overhang of large fixtures.



Variety of curves in the above template is scanned automatically by the tracing finger extending from the Hydro-Tel's 360° Automatic Profile unit.

There are two ways to mill large two-dimensional profiles. The hard way, when the operator uses two hands to control table and cross traverse, while keeping his eyes glued on the work and cutter. Or the easy low-cost way, automatic profile milling on a CINCINNATI 28" Vertical Hydro-Tel like the one illustrated here. This equipment greatly simplifies the operator's job. After he loads the fixture the automatic profiling unit takes charge of the operation, scanning the curvature of the template while automatically controlling the table and cross feed to mill the exact profile of the template.

This production idea can be extended to profile mill two, three or four parts at one time, with the corresponding two-, three-, or four-spindle head. There's no floor under costs when you plan your milling operations on a CINCINNATI Hydro-Tel. Cincinnati builds four machines of this type: 16", 28", 30", 36". Complete data for the 28" size described above may be obtained by writing for catalog No. M-1773-3. **Milling Machine Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.**

CINCINNATI 28" Vertical Hydro-Tel Milling Machine. General-purpose style illustrated. Can be equipped for die sinking and/or automatic profile milling, or multiple spindle production milling. Catalog No. M-1773-3.

KNEE TYPE AND BED TYPE MILLING MACHINES • DIE SINKING MACHINES
CUTTER AND TOOL GRINDERS • ELECTRICAL DISCHARGE MACHINES

CINCINNATI
MILLING MACHINE DIVISION

Congress Frustrates Union Heads

Labor Leaders Charge Letdown by "Friends"

Unions are not getting as much support as they expected from the Senate and House.

So they're warning legislators to produce or face opposition "next time."—By G. H. Baker.

▪ Union officials are boiling mad at some of their "friends" in the Congress. For their "friends" are not performing as expected. This year's session of Congress is two-thirds completed, and labor leaders are privately fuming at their inability to get all they wanted from the Senate and the House. Areas of disappointment: Taft-Hartley reform, aid to distressed areas, civil rights, unemployment compensation.

What irks the union heads is that many of the congressmen tagged as "backsliders" were elected in part with union money. This kind of ingratitude is rubbing salt in an open wound, as far as labor leaders are concerned.

A Warning—Take, for example, this recent tight-lipped warning from Al Hartnett, secretary-treasurer of the AFL-CIO International Union of Electrical Workers:

"We are watching carefully and compiling records diligently, and those who showed false colors during last year's campaign will have to answer when election time rolls around once more."

"Produce, or Else"—Same situation is current at COPE (Committee on Political Education), the political action arm of the AFL-CIO. Officials there are grimly looking over the voting records of senators and representatives who rode to office partly with union money.

"We're going to be more selective in choosing our friends next year," an AFL-CIO official says. The implication is plain: Those who either can't or won't dance to the tune called by the labor hierarchy are likely to be confronted with not only loss of union support but opposition.

Road Financing Worries Congress

Financing schemes designed to keep federally-aided roadbuilding from faltering are weighed, gingerly, by the Congress.

The lawmaking body has been reluctant to tackle the task of finding more revenue for road than is now provided by law. Highway-use taxes voted in 1956 were supposed to be adequate to cover the federal share of the costs of an expanded system of superhighways. But now Congress admits construction will lag unless more money is found soon.

Deficit Threatens — At the latest reading, the federal highway trust fund was in the black by nearly $500 million. This healthy condition won't last long, however. By June 30, 1960, the trust fund will show a deficit of $241 million, if the government continues apportioning road funds on schedule. A year later, the predicted deficit is to exceed $1 billion.

What Congress must do is to approve a plan for getting the roadbuilding effort over the two-year hump beginning in July of this year. A workable interim financing method is urgently required. It should suffice until after Congress receives, in January, 1961, revised estimates of the cost of completing the 41,000-mile interstate road net.

Which Missile Gets the Nod?

Congress May Act — Congressional action may be the sole means of ending the Defense Dept. indecision as to a single missile for defense of U. S. cities.

Two ground-to-air weapons, the Bomarc and the Nike-Hercules, have been tested repeatedly by the Air Force and the Army, respectively. Results have shown, these services say, that the missiles can bring down hostile bombers and break up bomber formations. Yet, Defense Secretary McElroy has not decided to rely on one or the other.

McElroy Hesitates — He tells Congress, instead, he would not protest if he were forced by law to select one of the two as the defense missile. This open invitation to Congress to take the decision out of his hands may be accepted by the lawmakers. As an economy measure, Congress can force the dropping of a missile system by denying funds for it.

The Bomarc, with Boeing Airplane Co. as prime contractor, is the longer-range weapon. With a solid-propellant booster, the improved Bomarc can engage a target 400 miles from the launching site. Nike-Hercules, a successor to the Nike-Ajax, has a range described as in excess of 75 miles. Principal contractors for it are Western Electric Co. and Douglas Aircraft Co.

Another! LAMINA BRONZE-PLATED PRODUCT

New Lamina Wear Plates Last Longer, Cost Less!

Now . . . save money and get better performance wherever you have sliding contact between flat metal parts! The principle of bronze electroplated on a steel backing originated with Lamina Bronze-Plated Guide Pin Bushings. Proven during countless millions of punch press hits, it is now being used successfully to produce flat wear plates.

This new concept in wear plate design combines the low cost, ready machinability and solid backing of steel with the long-wearing, non-seizing, free-running properties of a copper-tin bronze alloy. Lamina Bronze-Plated Wear Plates are flat, parallel, and can be easily machined to suit your application. Standard sizes available from stock. End costly wear problems and reduce expensive downtime now! Write for complete information.

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DIES AND TOOLS, INC.
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MANUFACTURERS OF LAMINA GUIDE PINS, BRONZE-PLATED BUSHINGS AND THE FINEST PRECISION PROGRESSIVE AND LAMINATION DIES.

How to Land Defense Contracts

U.S. Will Advise Small Contractors

There are more qualified bidders on defense contracts these days in the San Francisco Ordnance District.

One important reason: The work of the agency's small business specialist service department.—By R. R. Kay.

▪ Small businessmen looking for defense contract work have an important ally—Uncle Sam.

For proof of the government's interest in the small contractor consider the San Francisco Ordnance District. Within its operating area —which includes seven Western states, Alaska, and Hawaii—the number of new qualified defense bidders has taken a sharp upturn.

Help Where Needed—A big factor in the increase: The success of Ordnance's small business specialist service department. This agency stands ready to guide the small enterpriser who wants to share in defense work but doesn't know how to go about it.

Says Col. John M. Stark, commanding officer of the district: "It's an important part of our mission to spread the defense production base to the widest extent possible. The growth of new business in this district facilitates our continuing search for new qualified bidders to expose to government business."

Thirty Pct Increase — He notes there are currently some 330 contracts for about $210 million outstanding in the region. "During the past year," he adds, "we experienced over a 30 pct increase in the number of contracts."

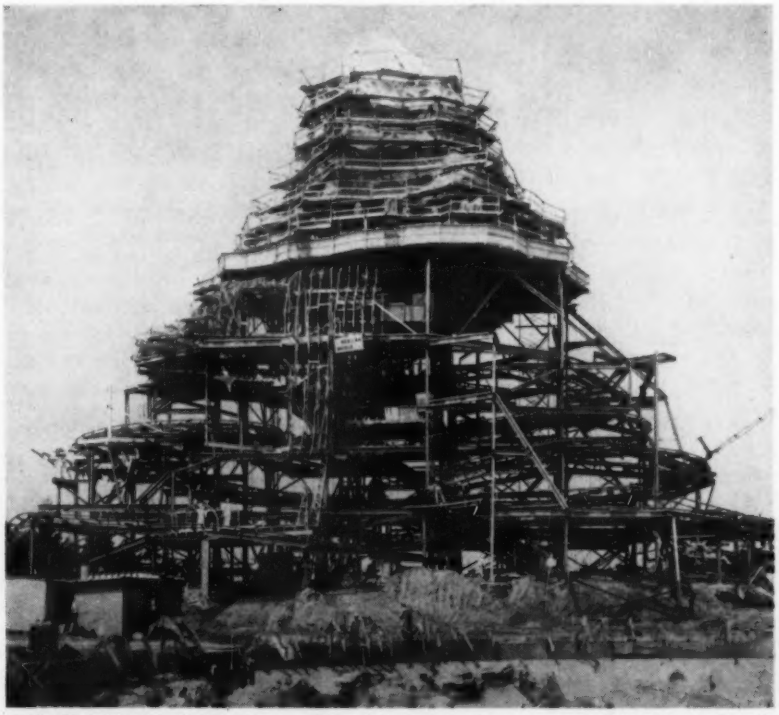
The big push into missiles and other space age programs—putting increased demand on electronics—should bring an additional healthy boost in qualified bidders in the San Francisco area, Col. Stark predicts

Building Amphibians—One Bay Area contractor—Food Machinery Corp., San Jose, (30 miles south of San Francisco)—is just finishing work on a $41 million contract for M59 steel armored, amphibious personnel carriers. This job meant work for some 2000 subcontractors —about half of them located in the Bay Area.

Now Food Machinery may get another big plum. It hinges on acceptance of the M113 (an aluminum version of the M59) which the company has already made in pilot plant quantities.

Work for Others—If Food Machinery gets the contract, Kaiser Aluminum will probably be brought in as a subcontractor.

No Two of a Kind on This Job



DISNEYLAND ALP: Unusual steel framework was erected by U. S. Steel's American Bridge Division at Disneyland Park. It forms base for an exact scale replica of Switzerland's famed Matterhorn mountain. There are no two pieces of steel the same length in the job, each was fabricated individually to match the mountain's exact profile.

EF Continuous Galvanizing Lines

assure unvarying uniformity of anneal and coating; high daily outputs with no un-scheduled downtime.

TOTAL DESIGN CAPACITY IN EXCESS OF 2,460,000 TONS PER YEAR*

Tailored to meet your specific requirements and incorporating the most advanced techniques, EF continuous galvanizing lines assure users high heating efficiency — accurately controlled cycling — and month after month of continuous, trouble-free, 24 hours a day, 7 days a week operation. You get maximum production — and return — per dollar invested.

The unvarying uniformity of product physicals — the bright even spangle — and the tight bond of the coating, preventing chipping or flaking — assure high market acceptance, and make subsequent forming and fabricating operations more efficient and less costly.

For utmost efficiency and economy on galvanizing operations, and all other continuous, or batch, heat treating of ferrous, non-ferrous or alloy materials, you'll find it pays to consult The Electric Furnace Company heat processing engineers.

* Tonnage output will vary depending upon width and gauge of strip being processed.

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THE ELECTRIC FURNACE CO.

Gas-fired, Oil-fired and Electric Furnaces for Heat Treating any Product, Using any Process, any Hourly Output.

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It Pays To Be Tough on Inserts

Kennametal Says You Can Cut Costs by Pushing Inserts

Direct labor and machine costs are cited as more important than tool costs.

Kennametal's advice: Don't baby inserts, concentrate on output.—By E. J. Egan, Jr.

▪ Are you "penny wise and pound foolish" in your use of fast-indexing, carbide cutting tool inserts—the kind you toss in the scrap bin when all the edges are worn?

You are if you baby them, say engineers at Kennametal, Inc., one of the leading producers of these inserts. Squeezing the last minute of life out of each cutting edge may save you a few pennies in tool cost, they say, but you may be throwing away dollars in terms of machine output and profits.

Kennametal's Campaign — The company is starting a campaign to show machine shop operators the relative importance of cutting tool costs versus fixed machining expenses as they affect overall cost per piece produced.

Treat 'em Rough—Don't baby these fast-indexing inserts as if you were still concerned about downtime for tool changes and setup adjustments, the company insists. You can forget about downtime when you can instantly flip an insert to a new cutting edge without shifting the tool holder or fussing with a new setup.

Instead, here's the way the company urges you to use your insert-type tools: First, set up the machine to run each job at full speed and power, consistent with workpiece accuracy and surface finish, of course. Then switch or replace the tool insert as often as necessary, even if it means a new cutting edge every 20 or 30 minutes.

Proof of Pudding — Does the technique really work to reduce machining cost per workpiece? Take a look at the savings shown in the accompanying table. The figures come from a booklet Kennametal is distributing as part of its campaign. Titled "There's Profit in Retiring a Tradition," it cites numerous examples of the way alert shops are using insert type tools to beat today's profit pinch.

Machine Tool Movie

An educational movie designed to show the general public what machine tools are and what they do for mankind has just been produced by the National Machine Tool Builders' Assn. Entitled "One Hoe for Kalabo," the 16 mm sound-and-color film runs for 27½ minutes.

After June 1, prints of the film will be available from Modern Talking Picture Service, Inc., 3 East 54th St., New York 22.

How Spending Pennies Can Save Dollars

	Job No. 1		Job No. 2		Job No. 3	
	240-Minute Tool Life Setup	25-Minute Tool Life Setup	75-Minute Tool Life Setup	25-Minute Tool Life Setup	120-Minute Tool Life Setup	80-Minute Tool Life Setup
Machine Cost Per Hour	$ 8.00	$ 8.00	$10.00	$10.00	$ 9.00	$ 9.00
Tool Cost per Hour	$ .04	$ .40	$ .36	$ .76	$ .14	$ .215
Cost per 8-Hour Shift	$64.32	$67.20	$82.88	$86.08	$73.12	$73.72
Pieces per Shift	51	181	8	17	94 hrs./pc.	41 hrs./pc.
Cost per Piece	$ 1.26	$ .37	$10.36	$ 5.06	$859.16	$377.81
Cost Reduction	70 Pct		51 Pct		56 Pct	

Table Courtesy Kennametal, Inc.

INDUSTRIAL BRIEFS

Eye on the Future—Universal-Cyclops Steel Corp. has purchased the land and buildings of the Flannery Mfg. Co. The facilities adjacent to U-C Bridgeville, Pa., plant will be used for warehousing of finished steel stocks and the consolidation of its Bridgeville plant offices.

Successful Blend—General Motors Corp., has consolidated its Central Foundry and Fabricast Divisions. Fabricast has become a part of the Central Foundry Div. and its two plants in Bedford, Ind., and Jones Mills, Ark., will be known as the Fabricast plants of the Central Foundry Division.

At Oak Creek—Bucyrus-Erie Co., S. Milwaukee, will build a research center at its Oak Creek test ground. This is the first of a group of structures planned for the 125-acre site adjoining Lake Michigan. The Research Dept., testing and equipment and machine tools will be transferred to the new building.

DUCTILE IRON SPOKESMAN: Robert S. Thompson, head of H. P. Seuscher Co., was elected president of the newly-formed Ductile Iron Society, Cleveland. The Society is composed of 65 ductile iron foundries.

Ion Propulsion Company—B. F. Goodrich Co., and High Voltage Engr. Co., Burlington, Mass., have formed a jointly-owned company, Goodrich-High Voltage Astronautics, Inc. The company will engage in research, development and manufacture of ion propulsion devices. Development of a lab ion thrust unit is underway. Work will proceed at High Voltage Engineering's Burlington plant, where the new company is based.

Moving Day—The United Alloy Steel Div. of U. S. Steel Corp., has moved to a new office and warehouse at 20495 Woodingham near West Eight Mile Rd. In addition U. S. Supply Corp., previously with offices in the Fisher Bldg., has moved to the Woodingham location in Detroit.

For Sea Duty—Salem-Brosius, Inc., Pittsburgh, has received an order for nuclear core components for England's first atomic-powered submarine. Ward A. Wickwire, Jr., company president, made the announcement at the annual stockholders meeting.

Open for Business—Davidson C. Wysor has opened an office as a geologist and sales engineer consultant at 50 Church St., New York, following his retirement after 45 years as a geologist for General Chemical Div. of Allied Chemical Corp.

Steam for the Co-op—Cleaver-Brooks Co., Milwaukee, has a $1.5 million contract for three large steam generators for the Medina Electric Cooperative, Inc., Hondo, Texas. Contract was awarded by the Rural Electrification Administration of the U. S. Dept. of Agriculture.

Capacity Doubled—Union Carbide's polyethylene production capacity in the United Kingdom will be doubled. Existing facilities at Grangemouth, Scotland, operated by Union Carbide Ltd., will be augmented by another 30 million lb per year production unit. It is expected to be completed by 1960.

30,000 Rectifiers Per Day—Fansteel Metallurgical Corp., N. Chicago, will build a new rectifier plant. The new facility will have automated equipment to produce more than 30,000 silicon power rectifiers per day. It is expected to be completed by Jan. 1, 1960.

Gift From Laclede—A structural test frame for steel joist, beam and slab loading has been installed on a massive force test slab in a new engineering lab building at Washington University, as a gift from Laclede Steel Co.

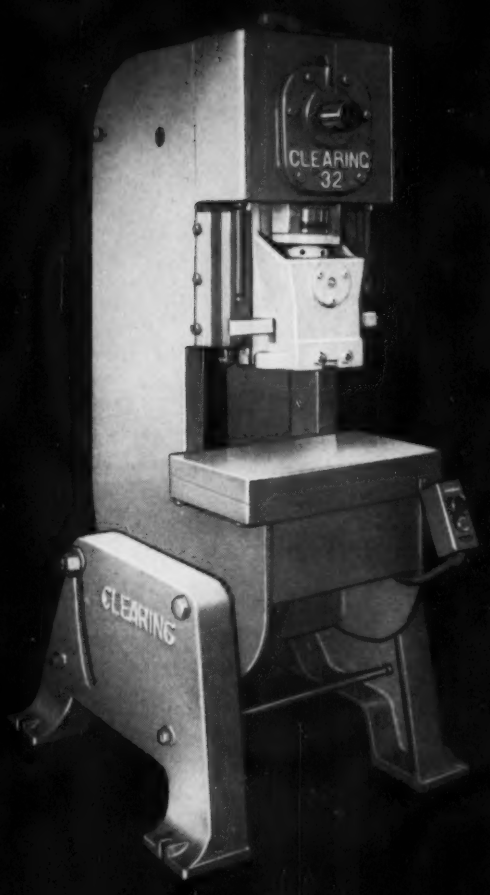
Stainless Strip — Calstrip Steel Corp., Los Angeles, has installed a new continuous annealing and pickling line for production of stainless steel strip. An annealing furnace, salt bath and pickling equipment is being used along with special feeding and rewinding units. Operations are contained in a building recently erected.

Stamping Expansion — Eaton Manufacturing Co. will undergo an expansion program for its Stamping Div. in Cleveland. It will involve capital expenditures of about $500,000 for additional plant space and new equipment.

Safety at Bethlehem — Forty-four operations of the subsidiary companies of Bethlehem Steel Corp., received National Safety Council awards for '58. This compares with 39 operations during '57. Of the 44 operations receiving recognition for their '58 records, 30 were repeats from '57.

Chemical Research Center—Diamond Alkali Co., Cleveland, will build a new multi-million dollar research center to be located in Concord Township. The center is expected to be completed in late 1960. When completed, the center will accommodate Diamond's Research Department.

New Owner—The assets comprising the Verona, Pa., plant of American Steel Foundries has been sold to Specialty Steel Products, Inc. The new owners will take possession June 1.



YEARS – YEARS – YEARS AHEAD

TORC-PAC—A REVOLUTIONARY ENGINEERING ACHIEVEMENT THAT WILL IMPROVE YOUR PROFITS

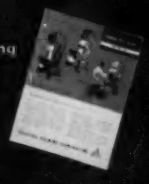
There is no reason to hesitate about purchasing a Torc-Pac O.B.I. just because it's "different." We know it's different! We planned it that way.

The air-friction clutch and brake, for example, is the most improved press drive ever. So, of course, it's the most "different" press drive ever. Most of the wear that you can expect in a conventional clutch and brake simply can't happen in the Torc-Pac. It can't happen because most of the initial pick-up load is applied to the clutch friction plates by oil placed in shear. The complete clutch and mechanically interlocked brake are sealed in oil and require no adjustment or maintenance whatsoever. The friction plates are sintered bronze—a material which will last many years beyond the life of a conventional lining.

The Torc-Pac is to conventional O.B.I.'s what the electric light was to the kerosene lamp. We'd like to explain the many reasons why this is true. Call or write. We'll look forward to hearing from you.

Clearing division of U. S. Industries, Inc. manufactures power presses of all types, Clearing-Axelson and Clearing-Harrison lathes, dies and special tooling, and special equipment for the aircraft and missile industry.

Write for further engineering facts on Clearing's line of Torc-Pac O.B.I.'s.



USI Clearing

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Roasting Supt. Charles Noonan, The Bunker Hill Co. Electrolytic Zinc Plant, Kellogg, Idaho. ESCO Spacer Casting exhibited by Noonan has been removed for inspection after 18 months of continuous service and is still in perfect operating condition.

"ESCO ROASTER ARMS LAST 2 TO 3 TIMES LONGER and saved us $12,000 in original cost"

"Since we started using *ESCO* Roaster Arms, two and one-half years ago, we have gotten more than two full year's service from most of them and 90 per cent of them are still going strong," explains Roasting Superintendent Noonan, Bunker Hill Co.

"Operating conditions here are among the most severe to be found anywhere," Noonan continues, "but the high heat and heavy concentration of sulphur dioxide gas in the roasters just doesn't seem to hurt the *ESCO* parts nearly as much as the previous ones." And *ESCO* Roaster Arms can be successfully welded in the event of damage.

ESCO Roaster Arms are "job-tailored" to individual operating conditions for longer life and lower operating costs. For help with all your problems of corrosion, heat and abrasion, call or write an *ESCO* engineer today.

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IN CANADA ESCO LIMITED

J. H. Smith, will supervise the consolidated activities of **Central Foundry and Fabricast Divisions** of **General Motors Corp.**

R. D. Bradford and **E. McL. Tittmann,** elected executive vice presidents, **American Smelting & Refining Co.; C. F. Barber** and **F. G. Hamrick,** elected vice presidents.

R. L. Allen, elected vice president, sales, **Bridgeport Brass Co.,** Bridgeport, Conn.; **W. J. Faust,** vice president and treasurer, and **R. W. Summey,** vice president, operations.

W. G. Mitchell, elected executive vice president, Western Div., Torrance, Calif., **The R. C. Mahon Co.,** Detroit; **D. L. Buttrey,** vice president, manufacturing, and **W. E. Willard,** vice president, Structural Steel Division.

S. E. MacArthur, elected vice president, finance, **Federal-Mogul-Bower Bearings, Inc.,** Detroit; **R. W. Muzzy,** elected secretary; **T. F. Russell,** elected controller; **E. W. Anderson,** elected assistant treasurer; and **A. R. Grix,** elected assistant secretary.

W. J. Hamley, appointed production control supervisor, South Pittsburgh plant, **A. M. Byers Co.**

T. A. Stone, appointed special assistant to the president, **The International Nickel Co. of Canada, Ltd.**

R. A. Von Kamecke, promoted to manager, New England district office, Natick, Mass., **Brush Instruments,** Div. of **Clevite Corp.,** Cleveland.

D. N. Culver, appointed district sales manager, Los Angeles, **Haynes Stellite Co.,** Div. of **Union Carbide Corp.; F. S. Boericke,** appointed technical service manager, Pacific Coast.

W. R. Gotshall, promoted to district manager, Indianapolis district sales office, **Continental - Diamond Fibre Corp.,** Newark, Del.

C. S. Newmarch, appointed manager, Philadelphia branch, **Whitehead Metals, Inc.; J. I. Doherty,** becomes manager, Cambridge, Mass., branch, and **C. C. McCarthy,** manager, Windsor, Conn., branch.

H. A. Boas, Jr., elected vice president, **The Budd Co.,** Philadelphia.

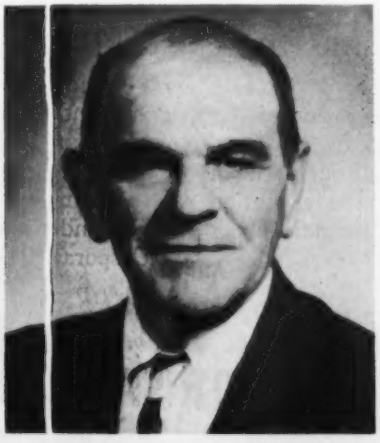
H. R. Miller, named superintendent, maintenance, Butler, Pa., Works, **Armco Steel Corp.**

J. G. Martin, named domestic sales manager, Boiler Div., **The Babcock & Wilcox Co.,** Barberton, O.; **W. E. Butler,** named manager, Cincinnati, O., district sales office.

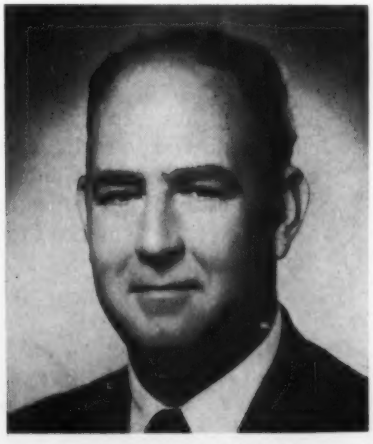
G. W. Robinson, appointed comptroller and assistant treasurer,

(Continued on P. 135)

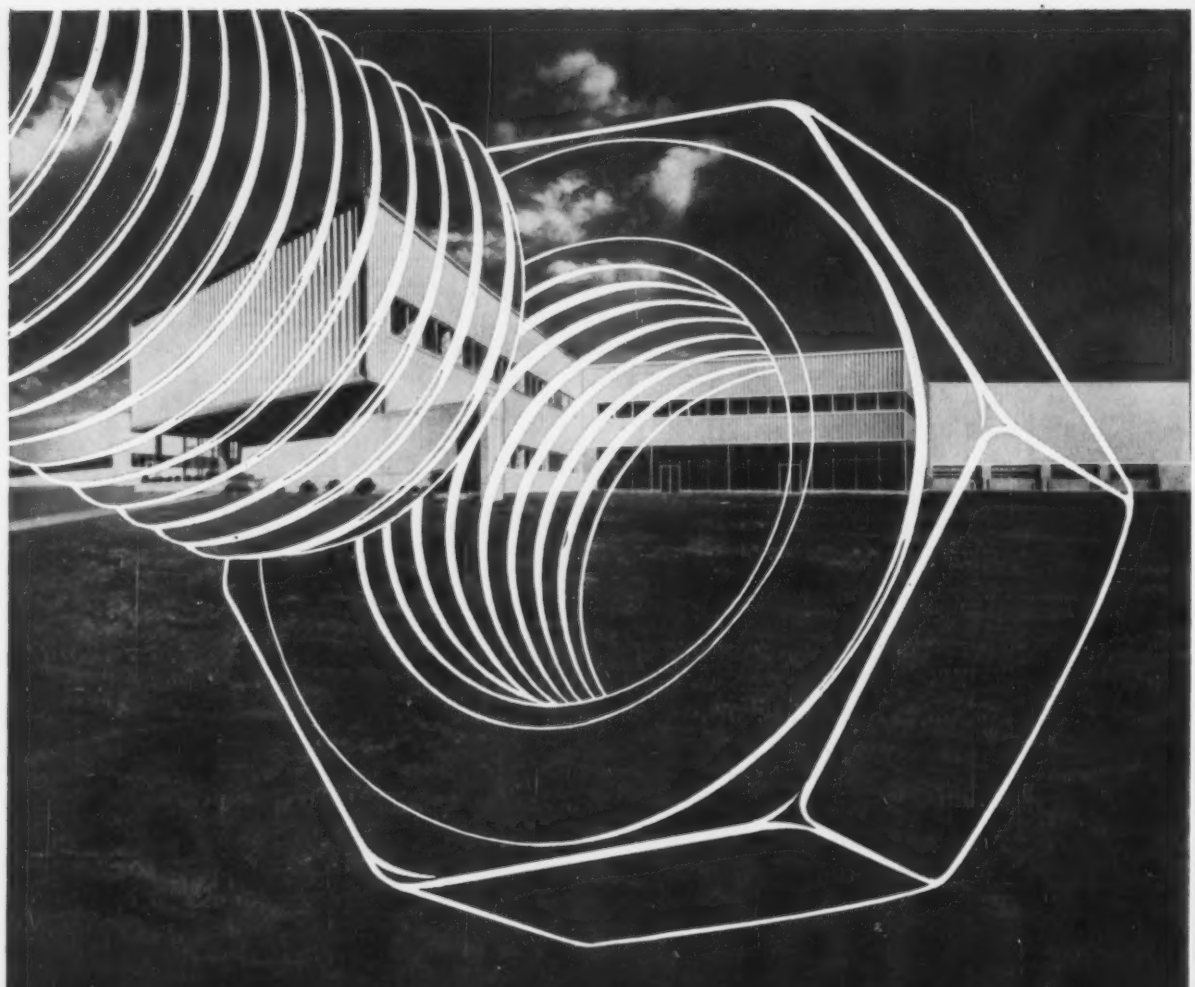
A. E. Gilman, elected president, **Bay State Abrasive Products Co.,** Westboro, Mass.



W. K. Meyers, elected president, **The Bassick Co.,** Bridgeport, Conn., subsidiary of **Stewart-Warner Corp.**



R. A. Castillo, appointed general manager, **Joseph T. Ryerson & Son, Inc.,** Houston, Tex.



A new name for a dependable old friend

On April 15, Pittsburgh Screw and Bolt shareholders voted to change their company's name to Screw and Bolt Corporation of America.

This new name clearly reflects our continuous expansion and diversification to service the ever increasing and rapidly changing needs of our customers. Today, with four major divisions and plants from Texas to Connecticut, our national scope of business has earned for us the reputation as producers of "America's most complete line of industrial fasteners."

In keeping with this progress, our new, fully integrated Pittsburgh plant, covering—under a single roof—an area equivalent in size to ten football fields . . . offers the utmost in operating efficiency. It is representative of the modern facilities and up-to-date production techniques that keep our quality tops and our service prompt.

We are happy to announce this name change to our many friends and look forward to serve you under our new banner . . . Screw and Bolt Corporation of America. VMA 6710

SCREW AND BOLT CORPORATION SERVES THE NATION **OF AMERICA**

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DIVISIONS: Pittsburgh • Gary Screw and Bolt • Southington Hardware • American Equipment

AMERICA'S MOST COMPLETE LINE OF INDUSTRIAL FASTENERS

(Continued from P. 133)

and **J. L. O'Toole,** assistant treasurer and assistant secretary, **Sharon Steel Corp.,** Sharon, Pa.

E. J. Herens, appointed manager, sales service, and **Robert Johnson,** named sales engineer, **Stanley-Humason, Inc.,** Forestville, Conn., a subsidiary of **The Stanley Works.**

C. S. Shepherd, appointed director, purchases, **American Bridge Div., U. S. Steel Corp.**

H. C. Tooley, appointed plant manager, Missouri City plant of **W-K-M,** a Div. of **ACF Industries, Inc.**

D. H. Weatherbe, appointed district credit manager, northwest sales district, **Kaiser Steel Corp.**

R. G. Hills, appointed purchasing agent, **New York Shipbuilding Corp.,** Camden, N. J.

W. E. Dugan, appointed credit manager, **Armco International Corp.,** Middletown, O.

E. T. Walton, appointed director, metallurgy, **Crucible Steel Co. of America,** Pittsburgh.

W. K. Whittemore, named manager, Eastern regional office, Arlington, Va., **Brush Instruments,** Div. of **Clevite Corp.,** Cleveland.

William Hallam, appointed sales manager, **National Electric Div., H. K. Porter Co., Inc.,** Pittsburgh.

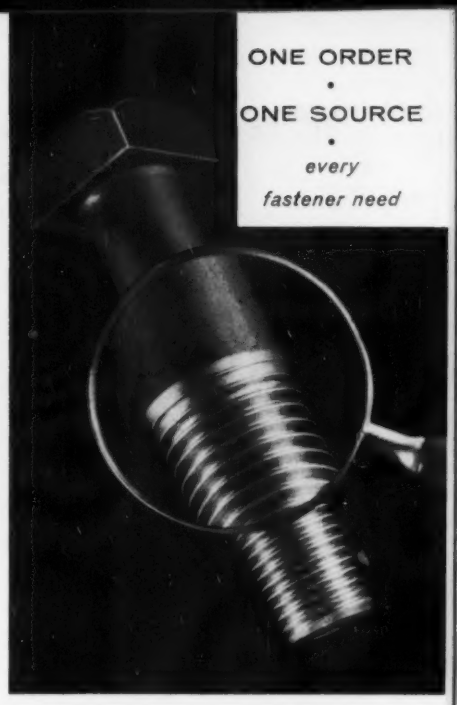
R. F. Doolittle, elected general counsel and secretary, **The Youngstown Sheet & Tube Co.,** Youngstown, O.

C. E. Sutton, appointed manager, marketing, Gas Turbine Dept., **General Electric Co.,** Schenectady, N. Y.

Don Finlayson, appointed sales manager, Chicago area, **Republic Mfg. Co.,** Cleveland.

E. J. Brinkman, appointed general manager, distribution and ser-

(Continued on P. 139)



Clean, Strong, Unified Threads from lot to lot!

Assure interchangeability with bolts and nuts that fit as they should—uniform from fastener to fastener, order to order.

Our quality controlled bolts and nuts meet exacting tolerances for proper fits and strong connections. Smooth-turning threads assemble easily yet snugly, and give maximum holding power.

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Sold through leading distributors.

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Interested in Oxygen? Nitrogen? Argon?

Here's Why "Big Three" For its New Fort

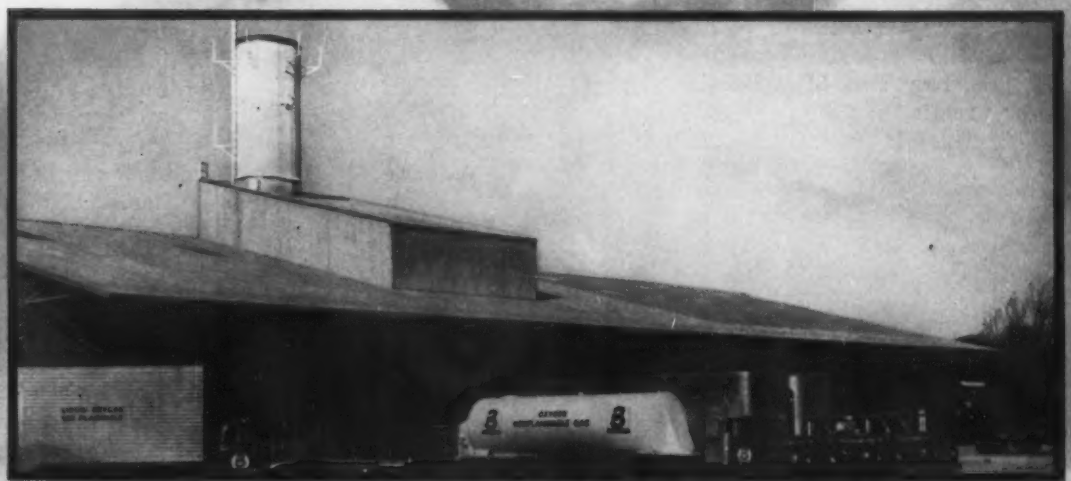
A leading oxygen producer in the Southwest, Big Three, considered very carefully its choice of an engineering firm to design and provide the equipment for a new tonnage plant for the Dallas—Fort Worth area.

That's why they selected Messer for the job!

Messer's long background in this country and abroad has established its reputation as a sound and reliable supplier of air separation plants of all types. In the past two years, Messer has been particularly successful in designing and engineering oxygen-producing equipment of the type Big Three wanted.

HOW IT WORKED OUT

Now that the Messer plant is "on stream" in Fort Worth, what are the results? To quote Mr. C. K. Rickel, Big Three president:



EXCEEDS CAPACITY—Big Three plant at Fort Worth runs above capacity whenever necessary; works efficiently and economically.

Chose MESSER Worth Oxygen Plant

"We are more than pleased with the Messer unit that we installed last summer. It is making its full capacity of oxygen, nitrogen, and argon very efficiently. I would be happy, indeed proud, to show anyone through this plant."

Can *your* business benefit by the installation of tonnage oxygen, nitrogen, or argon producing equipment? If so, be sure to consult American Messer. Your inquiry will be welcomed!

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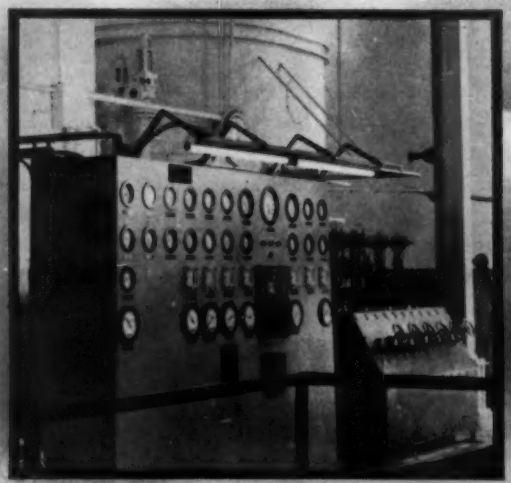
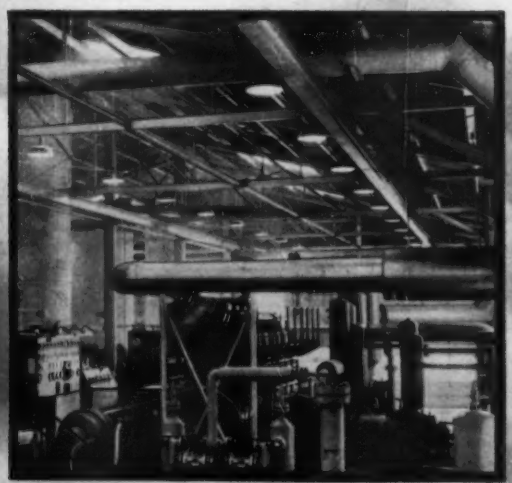
THERE IS NO SUBSTITUTE FOR MESSER EXPERIENCE



ONE OPERATOR PER SHIFT—Extensive use of automatic controls in Big Three unit requires little attention —only one operator.



REAL POWER ECONOMY—Power for this installation is furnished by an inexpensive natural gas engine—yields products at low cost.

BARIUM
STEEL CORPORATION

has changed its name to

PHOENIX
STEEL CORPORATION

PHOENIXVILLE, PA., May 1—The stockholders of the Corporation in their annual meeting have just overwhelmingly approved the change in name from "Barium" to Phoenix Steel Corporation.

The management of the Corporation believes that the effectiveness of its manufacturing, purchasing, sales, financial and other efforts will be substantially enhanced by the identification of all its operations with the "Phoenix" name under which its products are sold.

The name Phoenix has long been used by both major subsidiaries of the Corporation: Phoenix Steel Corporation and Phoenix Bridge Company. Since 1783 when the first iron was rolled at Phoenixville, nails, iron, cannon, railroad rails, steel plate, structural steel and, most recently, seamless pipe and tubing from the Phoenix facilities have played an important part in the nation's growth.

The Phoenix Bridge Company, founded in 1864, and the oldest in the country has also played a prominent part in the development of this country's unparalleled highway and railroad systems.

With another period of growth in prospect for this long-lived company, it is both fitting and efficient to identify all the Corporation's activities under its historic name: PHOENIX. *

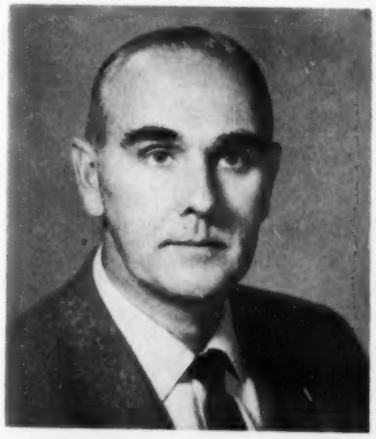
PHOENIX STEEL CORPORATION

**At the annual meeting, the stockholders were told that "a turnkey contract for the construction of the company's proposed oxygen steel-making plant at Burlington, New Jersey, will likely be signed in 60 - 90 days."*

(Continued from P. 135)

vice, and **C. A. Murdy,** appointed manager, direct sales, **U. S. Steel Export Co.,** a subsidiary of **U. S. Steel Corp.**

F. D. Brown, appointed marketing manager, Arc Welding Dept., **Westinghouse Electric Corp.,** Buffalo, N. Y.



L. S. Hilton, appointed manager, Abrasive and Diamond Wheel Depts., **Manhattan Rubber Div., Raybestos-Manhattan, Inc.,** Passaic, N. J.

Dane Smith, appointed district manager, St. Louis, **Vickers, Inc.,** Detroit.

W. R. Lewis, appointed manager, marketing and administration, **Union Carbide Ore Co.,** Div. of **Union Carbide Corp.**

H. C. Johnson, Jr., appointed assistant director, Product Development Div., Commercial Dept., **U. S. Steel Corp,** Pittsburgh.

Saves 85% gaging time!

"We estimate the DR-25 saves 85% of our time in checking hundreds of cylindrical plug gages every week. We save all the time formerly consumed in gage block build-ups to check each go and no-go gage. Our checks are more consistently accurate since we no longer have to ring gage blocks together carefully and let them cool back to room temperature to keep errors from developing. The generous spindle travel of the DR-25 accommodates a great range of work without accessories. We can now check thread plug and thread setting plug gages in a third of the time formerly required to check them with gage blocks and comparators. We've found the DR-25 rapidly pays for itself in accuracy and man-hours saved."

Charles McArthur,
Gage Engineer
Aeroquip Corporation
Jackson, Michigan

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PAR

the TRS Process that employs standard and multi-head machines to make riveting practically a new fastening method!

PAR . . . Production Automated Riveting

Perfected for over 3 years . . . proved successful in some of industry's most efficient plants . . . the TRS PAR Process opens the way to new economies for 7 out of 10 assemblers of metal products.

Through TRS Production Automated Riveting, costly manual handling of parts on the machine and between machines may be much reduced. Operations may be performed in multiple, simultaneously. Rate of fastening may be speeded up to an unheard-of point. Machine down-time and rejects cut to a negligible amount.

Automation of Assembly Operations becomes a reality through efficiently integrated and automatic . . .

1. FEEDING of tubular rivets or related products.
2. TRANSFER of parts to — or between — riveter stations.
3. SEQUENCING from 3 to 15 rivet setters to operate simultaneously or in any desired order.
4. CONTROL of setting force as required by parts thickness or material characteristics.
5. SENSING of improper conditions and stopping equipment to avoid injury to parts, equipment, or operator.
6. EJECTION of parts as required.

WHY only TRS Can Offer the PAR Process . . .

Obviously, there are two vital elements in the PAR process. Essential is the special knowledge and experience acquired by TRS engineers through the design, tooling and application of many Multi-Head Riveters for complicated production requirements. TRS originated Multi-Head Riveters over three years ago and is the only experienced source of these machines. Equally important, and partly resulting from this unique TRS experience, is superior knowledge of how to design an efficient system of riveters, feeders, transfers and controls . . . whether with standard riveting machines **or** Multi-Head Riveters

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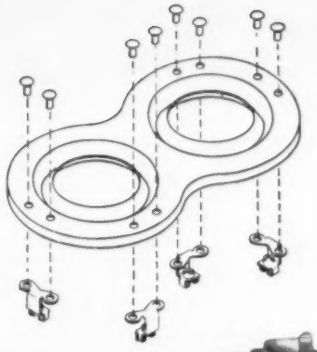
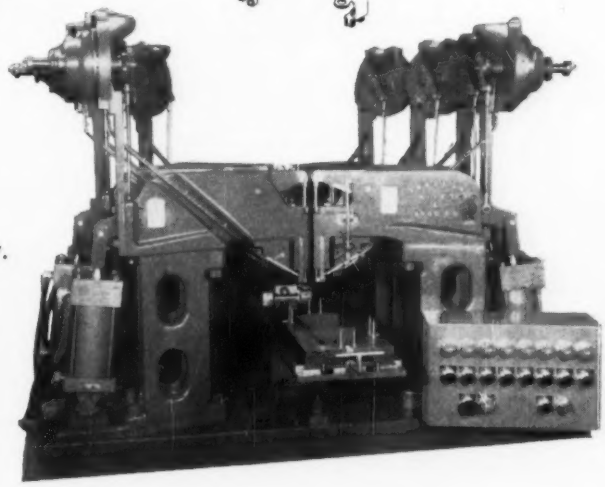
WAREHOUSE IN CHICAGO See "Yellow Pages" for phone numbers

ELECTRIC AUTO-LITE

attaches 4 brackets at a time with push-button speed

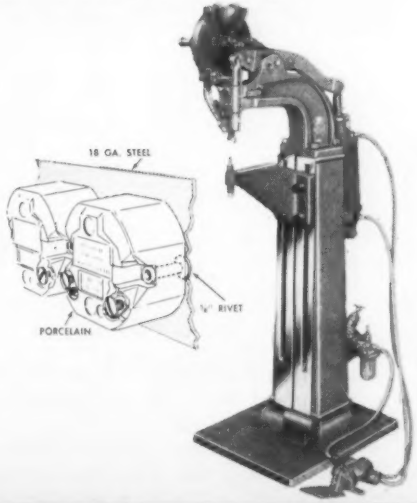




Dual headlight frames required the attachment of four angle brackets with eight rivets. Electric Auto-Lite invited TRS engineers to help develop a way to do it at high speed, with a minimum of manual handling. The solution is shown here . . . an ingeniously engineered TRS multi-head riveting set-up of eight independent air-powered machines working on very close centers, and a sliding loading fixture containing eight anvils. The operator need only load the frame and brackets, slide the loaded fixture into riveting position and press a button. All eight rivets are set simultaneously. A hold-down attachment on the loading fixture keeps the workpiece in position until released by the operator. A push-button panel permits independent cycling of any one or any combination of riveters if desired. An important feature of the set-up is in the relative simplicity of rearranging the machines as needed to accommodate a future change in parts design.

. . . *and* **LIBERTY ELECTRIC** *rivets porcelain switches with a standard machine, 1/6 of the labor, and no breakage*

Nut-and-bolt assembly of porcelain-base switches on an electric stove was slow, used relatively expensive fasteners. Automatic riveting would be far faster and cheaper — but how to avoid breaking the switches under the force of the setting? The TRS man had the answer: an air-powered long-stroke modification of a standard TRS riveter, adjustable for "cushioned" setting of the right size of cad-plated semi-tubular rivets. Results: Savings of 5/6 of the labor, savings in fastener cost per unit, higher uniformity of product, and no breakage.



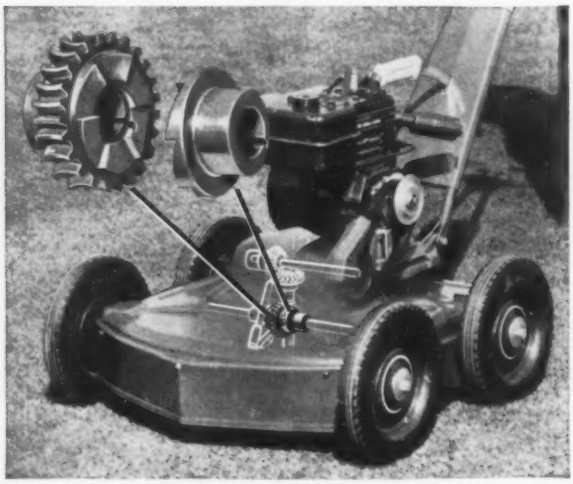
ASK to see more Case Studies . . .

. . . if your product can be riveted, and especially if several rivets are involved, phone or write that you want to see the detailed exhibit of the way many plants, large and small, use the TRS PAR Process.

The more automatic you make your riveting

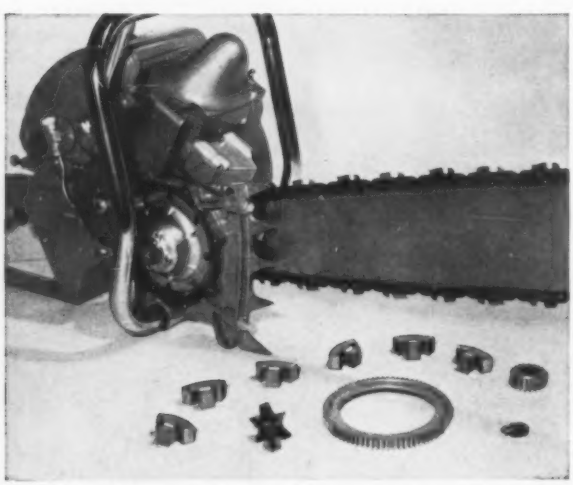
. . . the more important it is to use TRS Rivets

BOOST PRODUCT APPEAL with OILITE

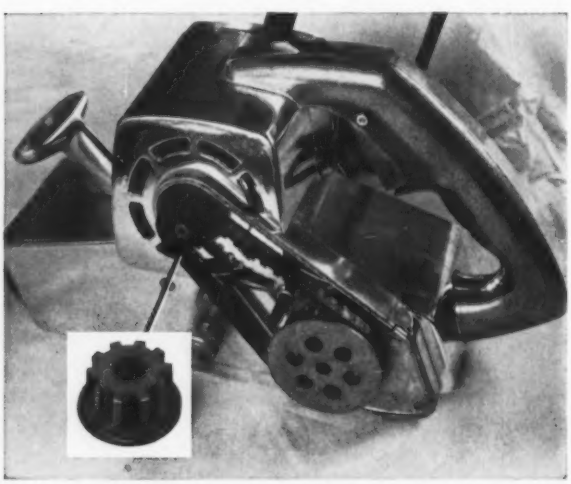


These 2 Oilite components now do the work of 4 former machined parts . . . contribute new economy, less upkeep.

Not one "squeak" from this conveyor . . . yet the dirt-encrusted Oilite bearings haven't been lubricated in 7 years.



Tough, wear-resistant Oilite gears, sprockets and clutch shoes keep costs low . . . make power saw more dependable.



The Oilite pulley of this heavy-duty belt sander provides yet another example of improved performance at less cost.

Quality-built OILITE®* parts and bearings add sales appeal to many fine products. For one thing, close tolerance Oilite parts wear less, weigh less and are quieter running . . . and Oilite bearings are tougher, maintenance-free.

** Only Chrysler Makes Oilite*

For another, Oilite components drastically reduce cost by eliminating material waste and costly machining. Why not contact your Oilite representative today? Look for him in the Yellow Pages under "bearings — Oilite" or write Dept. R-5.

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Can Product Designers Meet The Automation Challenge?

By Montgomery Ferar—Sundberg-Ferar, Inc., Ferndale, Mich.

What problems does automation pose for the product designer? How can basically standard products be altered year after year to recoup the manufacturer's investment in automated lines?

▪ Growth of automation in all metalworking plants is making the design profession scratch its head and think further ahead than just next year's model.

When a plant spends millions of dollars for automated equipment to produce a refrigerator — in which raw steel feeds in one end and the complete cabinet comes out the other—this equipment can't be changed from year to year.

The general style of this cabinet must remain the same for several years. But it must be possible to differentiate models from year to year. With all this the product must be compatible with automated production.

What Are Problems?—Automation brings with it new problems—the kind of details you don't run into in designing product-parts to be fabricated by the old batch method.

Let's go back to our example of refrigerator production. There are stations in the automated line where holes are punched for nameplates, handles and trim.

Because of the type of flanging required on refrigerator doors these holes must be a certain distance away from the edge so the punches have room to operate. In the old hand method of drilling these holes they could be placed anywhere on the box. With automation we're restricted, definitely, on the location.

Program of 1959 Design Engineering Conference and list of Show exhibitors begins on p. 180.

Controls Dimensions—Again, in the realm of dimensions we have to find optimum width for the product and stick with it. This goes for two, three, four or more sizes, say, of refrigerators. Obviously the cabinets coming down our automated line must be one width. So that means we have to standardize.

Perhaps we can vary our heights to arrive at three or four sizes. But at the very beginning of our design program we are stuck with certain

Montgomery Ferar

People Know Good Design

"The American public has basic good taste," says Monty Ferar. "Give shoppers a choice between good and bad, and they'll generally pick the better-designed product."

One of the oldest, largest and most successful industrial design firms, Sundberg-Ferar has had great influence on the design of both consumer and industrial products during the past 25 years. Its clients number some of the top industrial corporations. Products designed run the gamut from silver spoons to station wagons, sleds to electronic computers, furniture to factories.

Sundberg-Ferar believes in building products, not just drawing pictures. Many such arty flights of fancy can never be built. The company's designer-craftsmen work from actual models and must prove their designs can be manufactured.

"Design is the articulation of quality," Ferar declares. "Unfortunately, if your product is good—but doesn't look good—most shoppers will pass it by."

basic dimensions. And we dare not make a mistake on these.

What we will see, then, will be the effort to handle a whole family of product-parts on a single line. And there the big problem is to get a standard product. Even the cheapest one of the line will have the same basic dimensions, fittings and housings as the most expensive one. We trade up by having special trim and functional features. But basically the product is standard from top price to bottom price.

Challenge to Customize — The basic challenge, then, of automation is how to customize this standard type of product; how to come up with design answers so the consumer can clearly differentiate between models.

The designer has to apply basic merchandising principles. He must step up the design so there can be three or four price points with this same basic product. The designer's role is to dramatize the functional features. He must make the plus features obvious. And one way of doing this is by some form of visual expression on the exterior.

New Materials Help—New materials, new patterns, new colors will help. They can overcome the lack of freedom, of flexibility, of contouring. The wider choice of materials is giving designers a larger vocabulary of effects to choose from than ever before.

Many of these new materials are well suited to mechanized production. Injection molding machines have automated plastic-parts manufacture for some time. They run at a very high rate of production.

Die casting also turns out a more or less automated product now—and is growing more automatic. But one discipline designers have with die castings is to try to design them so they can be automatically polished. Hand polishing is a very expensive proposition.

Can't Forget Cost—So we must always try to create the design with an eye on the ultimate cost. Cost is certainly affected by the finishing process. Also, an advantage of these processes is that they are well suited to the modern trend to integrated design.

As an example, we recently designed a complete washing machine console as a die casting. This gave quite a saving over an assembled console because we could cast all sorts of lugs and fastenings into the interior.

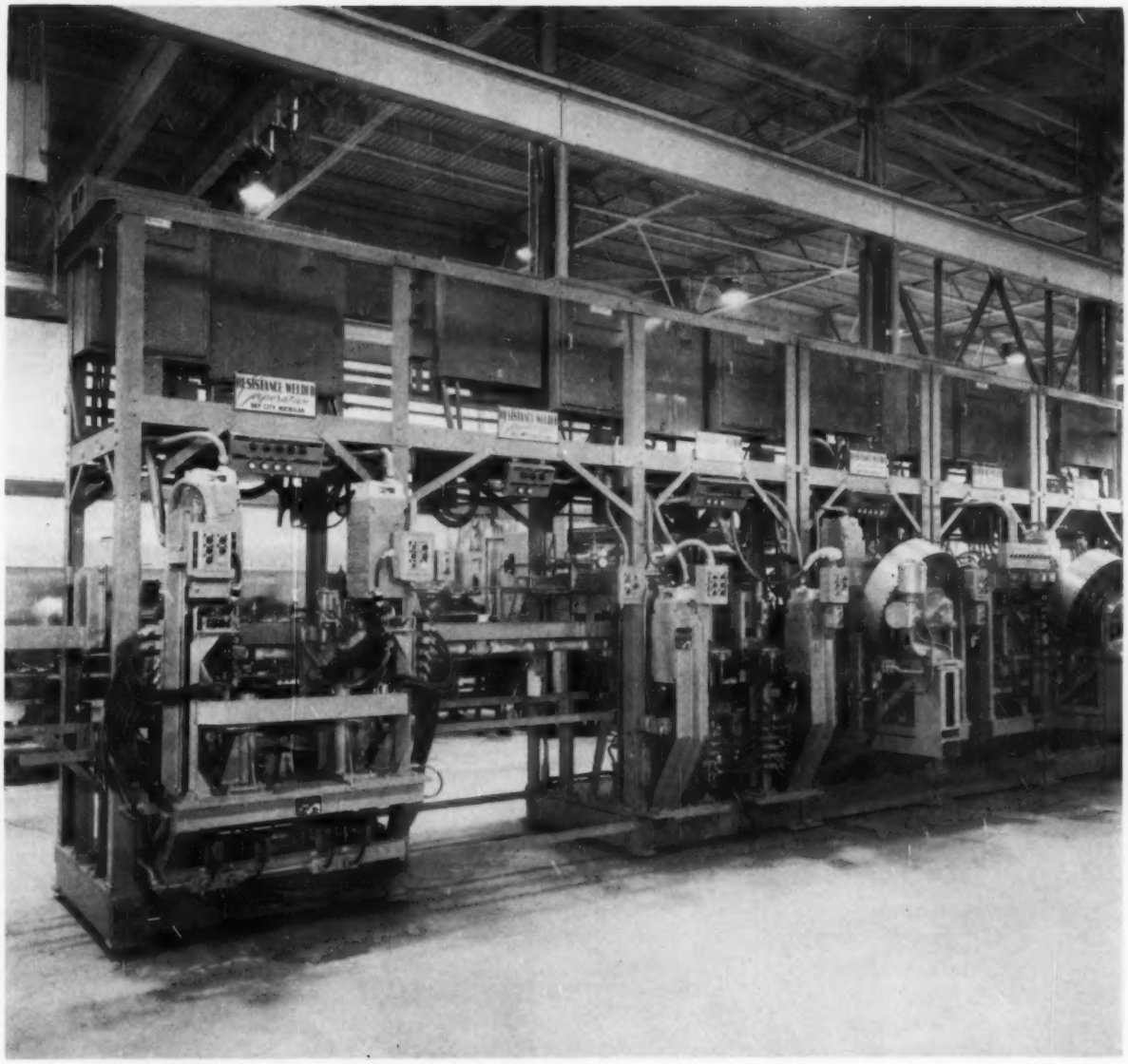
The result was a better product all around — both in design and manufacture. This kind of design usually means both better precision and more compatibility with automated processing.

Combine for Strength—Another factor is the more solid product resulting from elimination of separate pieces, as in unit-type automobile construction. Automatic welding joins the parts into a homogeneous structure, something you'd never get with nuts, bolts and other fasteners. This is a prime benefit to the ultimate consumer; joints never work loose, squeak or rattle.

In the electronics field, the high interest in printed circuitry derives from the same source. Here, again, there's a direct relationship: The more sub-assemblies you can simplify and eliminate, the lower the cost.

Need New Ideas—With industry becoming more and more competitive there's quite a premium for the company that can bring out a new way of doing something which makes sense in terms of efficiency

LOOK AHEAD: Industrial designers Ferar (left) and Sundberg must plan styling and sizes well ahead to match automation's special needs.



POSE PROBLEMS: Work stations on most automated lines can't handle a wide range of product shapes and sizes.

and better function. Here's where the industrial designer can make a real contribution.

He has an advantage in that he serves many different industries. He acts as a sort of cross-fertilization agent between industries. A principle he comes across in one place may be just what's needed in another. He has a fresh point of view and breadth from working in many different fields.

This transfer of ideas can be very valuable as we have seen many times. Also being aware of broad trends in design, being in the vanguard of forward thinking and planning in many areas, helps give direction to new projects.

Watch Timing—Timing in design is all important. To meet the challenge of automation the designer must be thinking in this new dimension early in the game. It's much easier to get a good basic design in the development or preliminary stages than after the product has solidified, so to speak.

Factors that make for compatibility with automatic processes must be considered from inception. And the same goes for appearance and other marketing elements.

We find our job much easier if we can have a hand in the arrangement of components in the beginning. But trying to work around some awkward proportions or arrangements sometimes becomes very costly. It may be impossible to correct bad geometry unless we start from scratch again.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

High-Impact Plastics Solve Design Problems

By **J. A. Petho**—Supervisor, Sales Engineering, Molded Products, Continental-Diamond Fibre Corp., A Subsidiary of The Budd Co., Newark, Del.

Designers are accepting thermosetting plastics as standards in their own right rather than as substitutes for metals.

A few basic techniques help in making the most of the rugged material in solving many design problems.

▪ Because they offer many advantages, molded high-impact thermosetting plastics are finding increased use in mechanical and structural applications. These advantages include light weight, resiliency, corrosion resistance, and quiet operation for moving parts.

As fillers, cotton, glass or asbestos fibers are treated with phenolic, melamine or polyester resins. Depending on the shape of the part, macerated, laminated, or combined macerated - laminated forms are used.

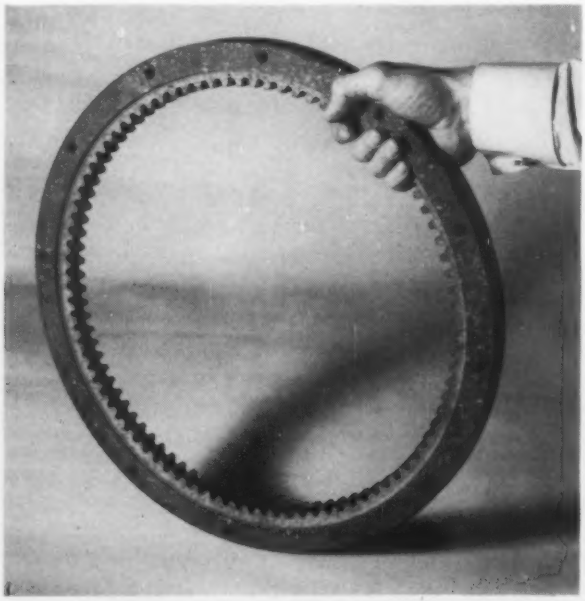
Wide Service Range — Today's molding materials offer a wide range of physical properties: Izod impact strength is from 3-20 ft-lb/in. notch. Tensile strength runs from 6000-20,000 psi; flexural strength from 10,000-35,000 psi and compressive strength from 19,000-38,000 psi.

Parts will operate at continuous temperatures of 250° to more than 600°F. Some of these materials feature short periods of heat resistance in the range of 5000°F, making them suitable for missile applications in some instances.

Check Design Hints—In working with these materials, it pays to consider basic techniques for solving design problems. It must be realized that parts of plastic are not as rigid as metals.

However, due to their lower specific gravity, heavier cross sections can be designed to give parts the same strength as heavier metal ones. Often, even with heavier cross sections, the plastic part will still be lighter than its metal counterpart.

Taking a light metal such as aluminum for comparison, it's usually not possible to use the same forms and dimensions for a plastic part as those designed for aluminum. If the plastic part is under a straight compressive loading, in theory no increase in cross section is needed for comparable strength.



WIDE SERVICE: Plastic gear (left) replaces steel ring gear for quiet operation and longer wear. Plastic wheel (right) will not mark or damage floors. In case of hand trucks, operator can handle heavier loads.

Key in Cross Section—However, when the plastic part is under a tensile loading, a cross section increase is recommended up to the point of equal weight. When rigidity is of paramount importance, in addition to cross-sectional increase, design calls for use of ribs.

While successful plastic molding depends heavily on part design, knowledge of different types of molding is essential. Molding can be either with high pressures or with low pressures, using mold designs most suited to the job.

High-impact thermosetting plastic molds can be divided into four design groups: compression molds, flash molds, filler plate molds, and transfer molds.

Simple Compression—The mold most frequently used for high-impact plastics is the compression type. The type subdivides further into positive and semi-positive molds.

A positive mold has no provision for excess material whereas the semi-positive type mold has bleeder openings for this purpose. Both are made up of three pieces: a ring and top and bottom plates.

The top plate receives the pressure and the bottom plate the reaction, or vice versa. The purpose of the ring is to contain the material and form the side walls of the plastic part.

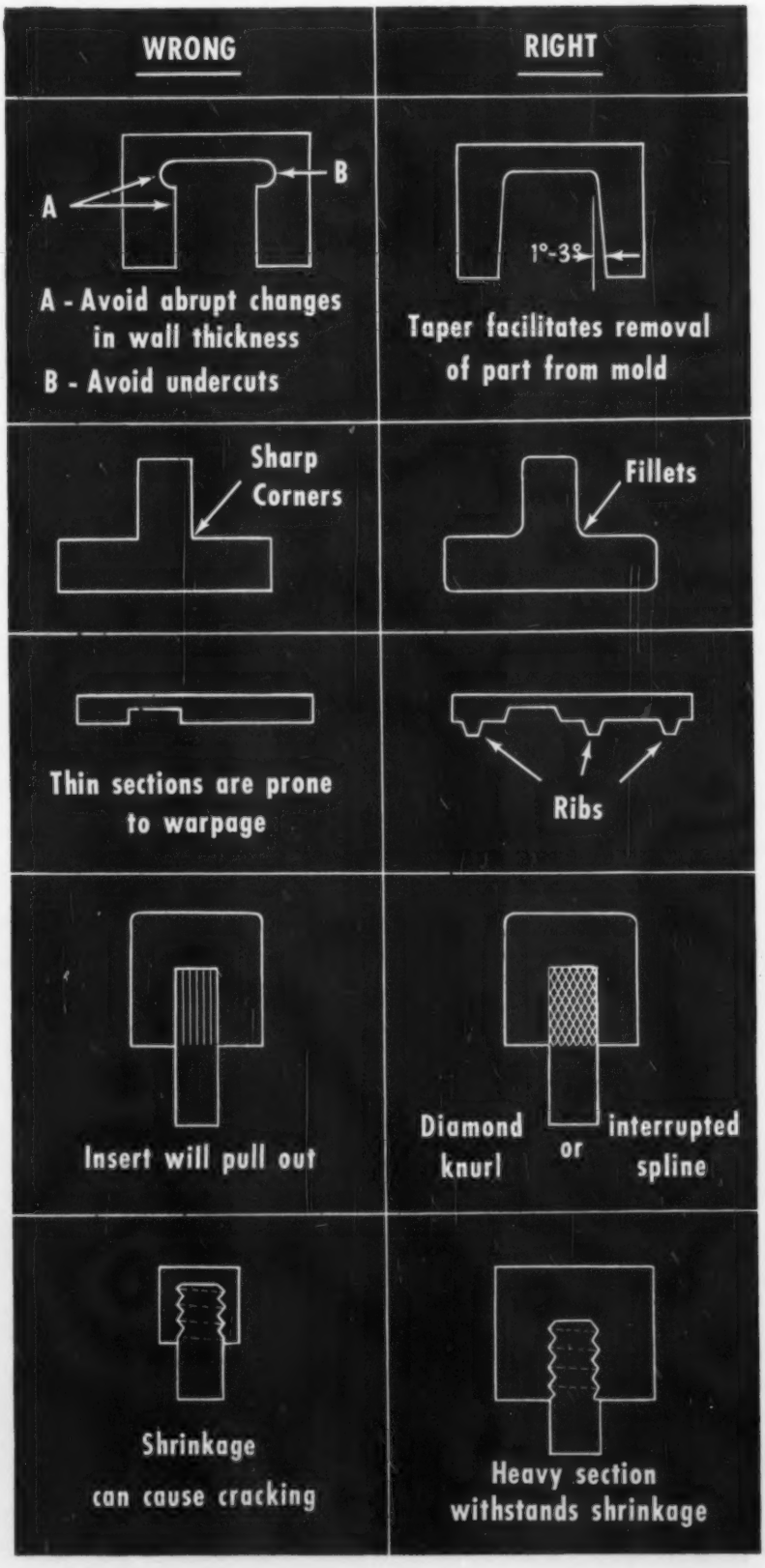
Preform for Flash—Flash molds are two-piece molds consisting of one top and one bottom plate but no ring. The excess material is flashed off through the parting line of the two plates.

In this type of mold the plastic charge must be preformed, thus reducing the bulk factor to eliminate excessive flash.

Flash type molds have lands to control the dimension of the molded piece. The lands are designed to take the full pressure of the press to prevent damage to the mold in case the plastic charge is insufficient.

However, too large a land area causes a stagnation of the flashed

Hints to Smooth Production



SOLVES BEARING PROBLEM: Plastic roll neck bearing for steel mill rolls requires only water cooling. It eliminates greasing.

material. This results in excessive flash thickness and oversized parts.

Combine Methods—Filler plate molds are a combination of the flash and compression types. Here the filler plate acts as a ring permitting the loading of the mold without preforming the plastic charge.

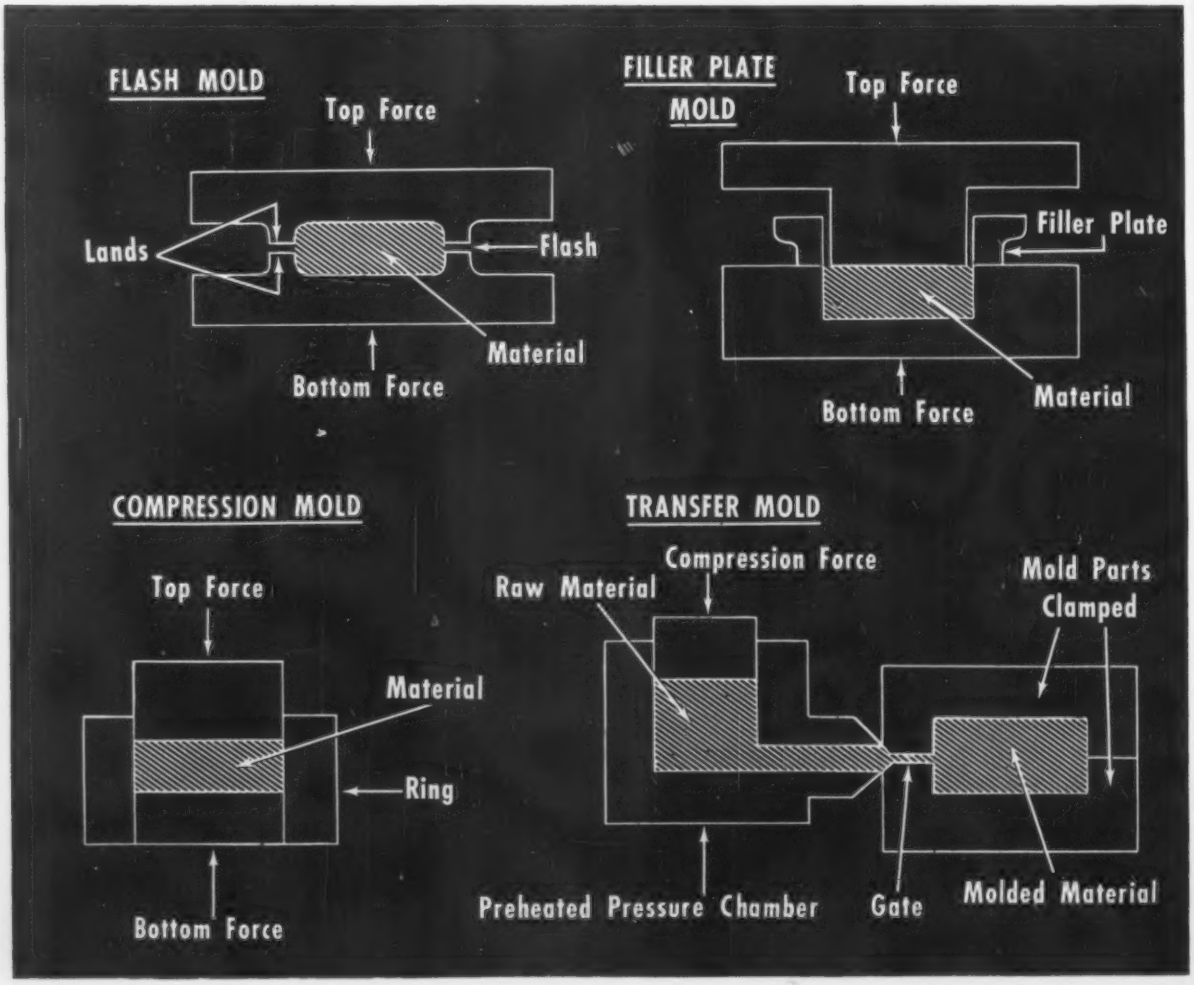
At the same time this plate allows the flashing off of excess material as in a flash mold. For molds of this type, the area of the filler plate must receive the same design consideration as the land areas in the flash mold.

Use Preheat—Transfer molding is based on the principle of preheating the plastic material in a pressure chamber and then moving the softened plastic under high pressure through a gate into the closed and heated mold cavity. This method is satisfactory for some plastic materials, but physical properties will not be as good as those produced by compression molding.

Parts with uniform sections and large radii can be molded in laminated form. Other parts require a laminated-macerated combination.

Because of weight variations in plastic charges, mold wear, distortion and shrinkage of plastic materials, a commercial tolerance of ±0.015-in. per in. thickness or 6-in. diam is a good average. However, by using molding compounds with glass and asbestos fillers and phenolic resins considerably lower tolerances can be produced.

Mold Types Fit Many Design Situations



LIGHTER AND THINNER: New-type plastic section for cross-flow cooling tower is trimmer than previous designs. Author Hassenplug (left) discusses its features and advantages with project engineer M. A. Ambrose.

How to Use Modern Materials For Better Product Designs

By **W. M. Hassenplug**—Vice Pres. & Engineering Director, Acme Industries, Inc., Jackson, Mich.

To get the most from new materials in any product design, give your designer elbow room. Tell him what you want the product to do, then let him engineer the job.

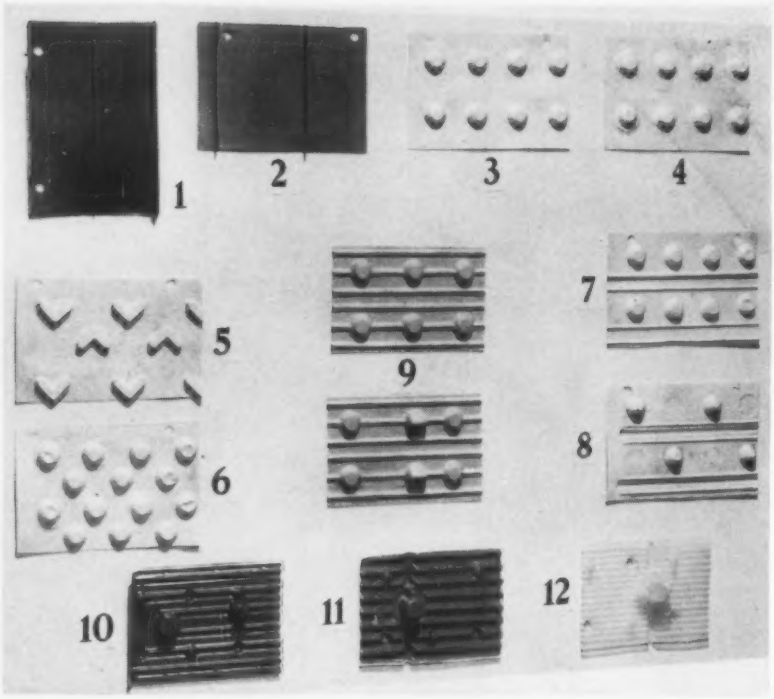
▪ When you set about designing an improved product you want to make the most of modern materials. Proper use of newer materials can be rewarding. You can cut product costs, simplify parts manufacture and assembly, and secure other competitive advantages for your company.

But such gains are seldom made without painstaking effort—and preplanning. Take modern plastics, for instance. Certainly this family of materials does have many fine properties. But some of the very limitations that are skipped over in the textbooks may be the ones that give you trouble, as they did us.

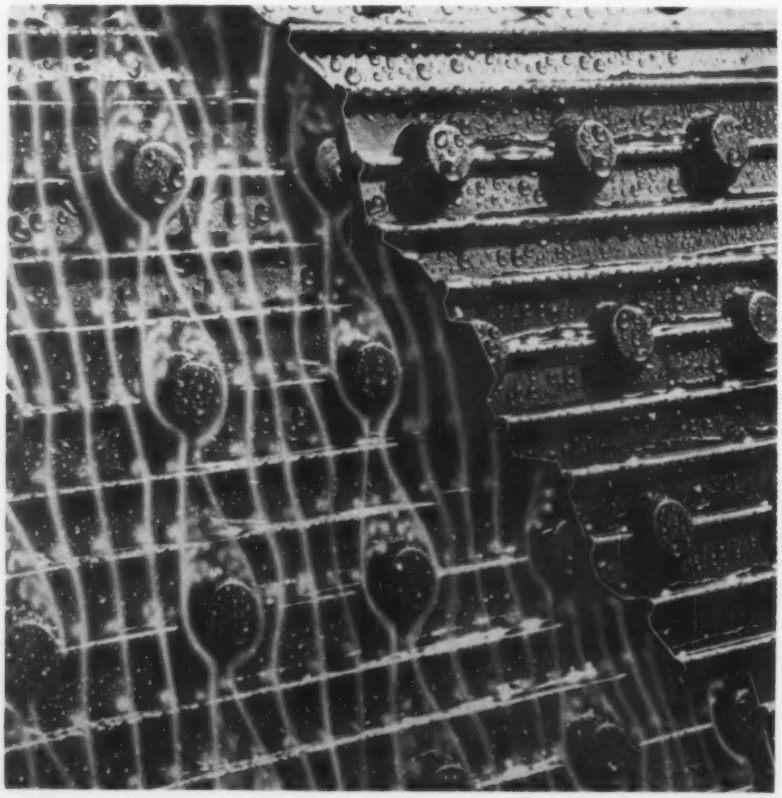
Begin With Function—Where do you start, then, to redesign with new materials? Too many times a company ties the design group's hands by tossing it detailed specifications. Design is expected to take it from there and give the product form and substance.

Our experience in engineering inexpensive, high-quality air conditioning components shows a better way. That's to start from the function. Plan what you want the parts or units to do; decide what performance you must have. Then let engineering come up with the materials and design to do it.

Seek Better Material—To show



DESIGN AND TEST: Non-wettability of plastic led to many different fill deck sheet designs in attempt to make a better water cooling tower.



FINAL DESIGN: Button-and-rib pattern on plastic sheet spreads water efficiently on non-wettable surface. Buttons also improve cooling by creating turbulence in upcoming air (left) at water-spread points.

how it works let's take a look at our new plastic cooling tower design. This development took several years and many redesigns to perfect. We knew from the start, however, what we were seeking.

We wanted a better material for the basic elements than the galvanized sheet or redwood used in conventional designs. We thought one of the new plastics might be it. According to the book it was longer lived, lighter, cheaper, and easier to fabricate. So we began by looking at the function of the tower.

How it Works—Basically a cooling tower is a ventilated chamber for spraying water into a stream of air to cool it. In practice, the water sprays over closely sandwiched surfaces called a fill deck.

In our counter-flow tower, where we started our program, the fill decks are stacked vertically. Water passes down over them; air is forced up from the bottom. That way the water and air move in parallel but opposite directions.

Good and Bad—Plastics, such as the newer styrene types, seemed to offer many improvements over redwood for the decks. Plastics are much lighter; not subject to fungus, acid, or alkali attack; do not absorb moisture. In addition they have high impact strength, are more readily formed and can be made into much thinner sections than wood. Our approach was to use plastic sheets in the same number and sizes as the galvanized steel sheets used in a previous deck design. But the one thing that quickly showed up was that the plastic would not wet. Water poured over a sheet wouldn't spread out into the required thin film, which is important to get the most use from the surface area for a given volume of water.

Try Varied Designs—This is no problem with either redwood or galvanized steel. Even when the latter is left with an oily surface from manufacturing it soon becomes wettable from action of impurities such as dust and scale. But it was

apparent that the nature of the plastic surface would change little in use.

To get a wettable surface we tried abrading the plastic, etching it chemically — even painting it. Then we decided to try mechanical-design changes. We thought the optimum design would be one with the maximum surface; if enough surface were there, the cooling tower would work.

Many Failures—The first design we tried was vertical ribs. The big drawback here was that once either air or water got trapped in one of the vertical chutes it would not re-distribute. And with the chutes running full of water no air could get through.

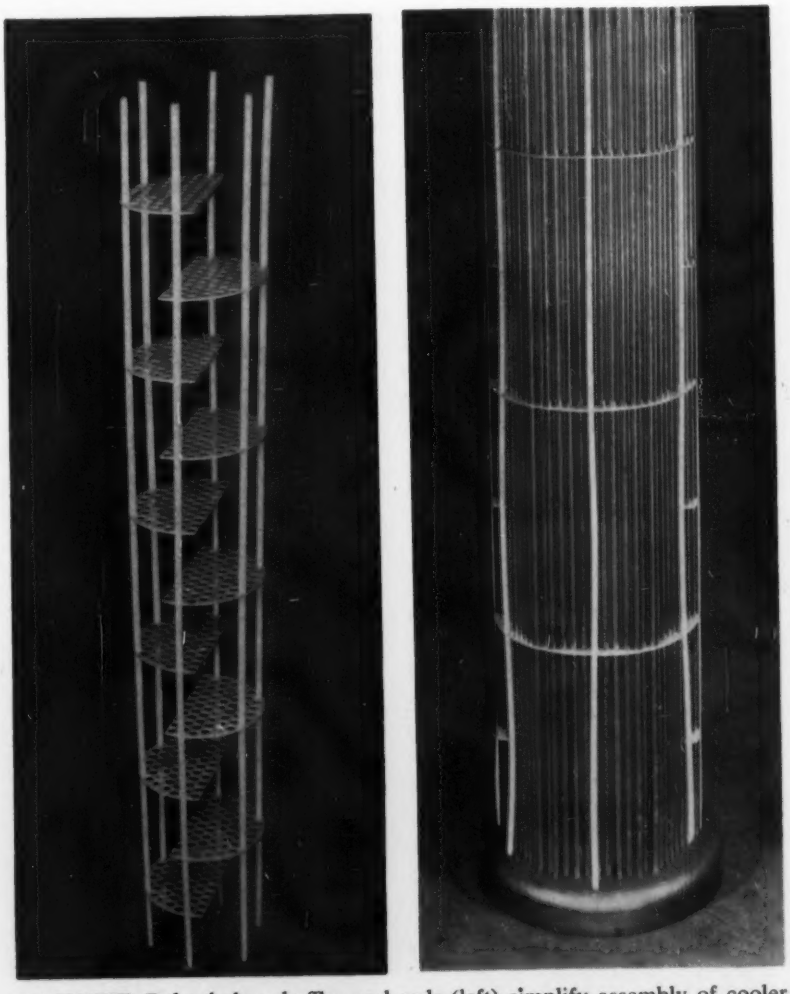
The next design step was to put little buttons on the plastic sheet in a staggered pattern. But then the water ran in rivulets from button to button. Another idea was placing a screened impression on the surface. Again, this was a failure, but it was a step forward in our thinking.

Understand Problems — About this point we began to understand the problem of wetting the surfaces and spreading the water. So we went to a chevron design, using inverted V's on the plastic sheets in an attempt to spread the water and prevent it from gathering.

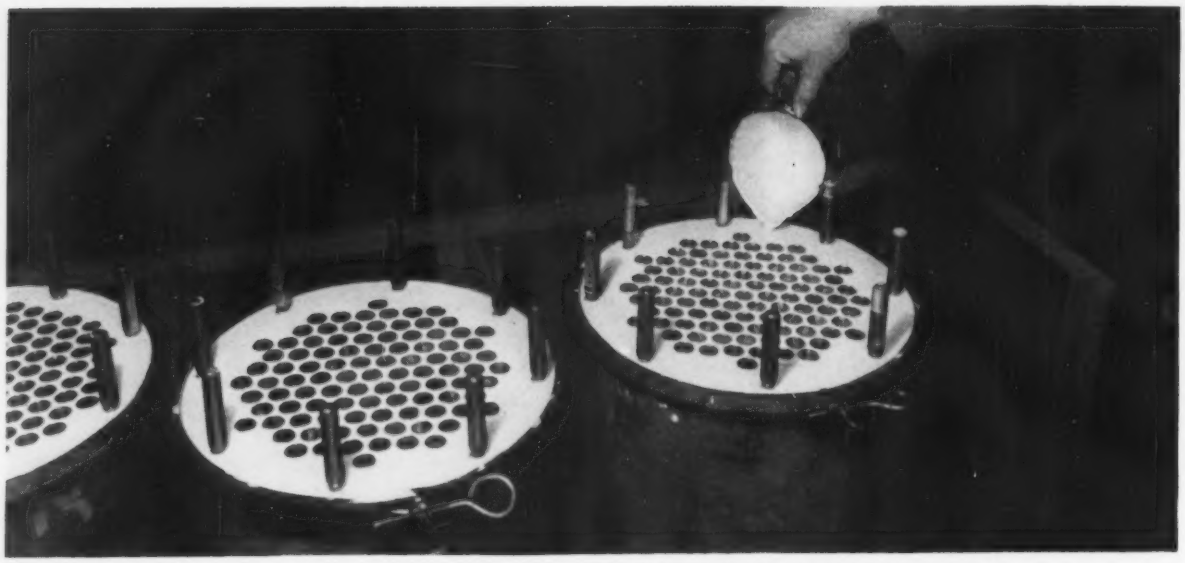
As the water came down onto one row of inverted V's it would spread, drop into the row below and respread. This design showed we were on the right track, but it wasn't good enough. Besides, the air pressure drop was too great for economical operation.

Rethink Design — As with any new design problem we were learning from our failures. After each improvement in performance we went back to think out what we had done. So then we came up with a button - and - spreader - rail design. This was the one that did the trick. When this deck went into the test

UNIFORM COVERAGE: Inexpensive, non-clogging plastic nozzles spray water in a smooth, even pattern for maximum cooling tower efficiency.



EASY FIT: Polyethylene baffles and rods (left) simplify assembly of cooler for small chiller unit. Lubricity of the plastic insures that copper tubes can be inserted (right) for tight fits without scratching.



ADDED PROTECTION: Epoxy resin poured around silver soldered joints of condenser guards against corrosion.

tower it immediately showed superior results.

Its action is as follows: Water comes down over the buttons and spreads. Then the stream hits a little spreader rail, fans out along it, and spills over. It may reform into rivulets before it gets to the next rail, but then it spreads again.

When this design proved successful we tried puting ribs on the other side, but this proved of no benefit. A further improvement was a method of maintaining positive clearance between sheets in the wire baskets that hold them in place in the tower. This is simply a key button that keeps the sheets from shifting.

Success From Failure—This entire development illustrates a fundamental of engineering: Unless you fail a couple of times, you don't know why you succeeded. Good design is usually a progressive thing where you make improvements in successive steps.

In working with new materials the problem is to become familiar with their properties in terms of your application. The book will tell you, for instance, the softening temperature of a given plastic and other physical characteristics. But you may have to learn for yourself that its surface is greasy and nonwettable.

How to deal with these unexpected factors takes experience. In trying to engineer a new product with a new material you expect and plan to meet these problems.

Need Proper Application—Trial and error may show you that you don't have a proper application. For instance, on these same water towers there are long Z-shaped blades of galvanized steel. These "eliminators" knock down any excess moisture from the air discharging from the tower.

We tried to make these Z-blades from plastic. But we found that plastic was not rigid enough in the long blades; it tended to vibrate. So we stayed with the original material in this case.

On the other hand the opposite proved true of the deck-spray nozzles. We had used machined brass nozzles to distribute water in the tower. Conversion to an injection molded plastic design dropped their cost as much as 75 pct. And the new material, we feel, is functionally superior, as well as lighter

Other Uses — We've found still other areas where new plastic materials prove more economical and are better adapted. In one of these, a ¾-in. thick sheet of foamed plastic insulation replaced 3 in. of rock cork and a sheet metal jacket on a small chiller unit.

This is a great improvement both in fabrication and in use. Appearance of the chiller unit is enhanced, it's less easily damaged, and it takes up less space.

Aids Assembly — In addition to lower material costs, improved function and lighter weight, we find ease of fabrication with plastics to be an important factor in some instances. One example is the use of polyethylene plastic baffles which are spaced by rods of same material. Notches in the baffles and rods permit an "egg-crate" type of assembly for chiller units.

In loading copper tubes through the baffle bundle, scratching is virtually eliminated. Closer tolerances are held, also. This improves the product because there's less chance of water by-pass due to the tighter fit.

Baffle diameter is also held closer to the inside diameter of the chiller unit's outer shell. The plastic baffles are easily machined. Each one is punched and machined in conjunction with its chiller assembly.

Each of these applications was engineered from a practical viewpoint to use the best properties of a new material. It's only common sense to take this approach.

Model-Building Kits Save Time In Testing Design Theories

Design engineers are using fewer sketch pads these days. Instead, they're checking design concepts with working models, quickly assembled from well-engineered construction kits.

▪ Small-scale working models are widely used today to explore new ideas, to study and improve existing methods, and to sell a variety of products.

Although models represent an excellent way to prove the worth of any design concept, the problem is to do it at a reasonable cost. If a number of competing concepts appear promising, the cost of actually making the miniature components for each model is often prohibitive.

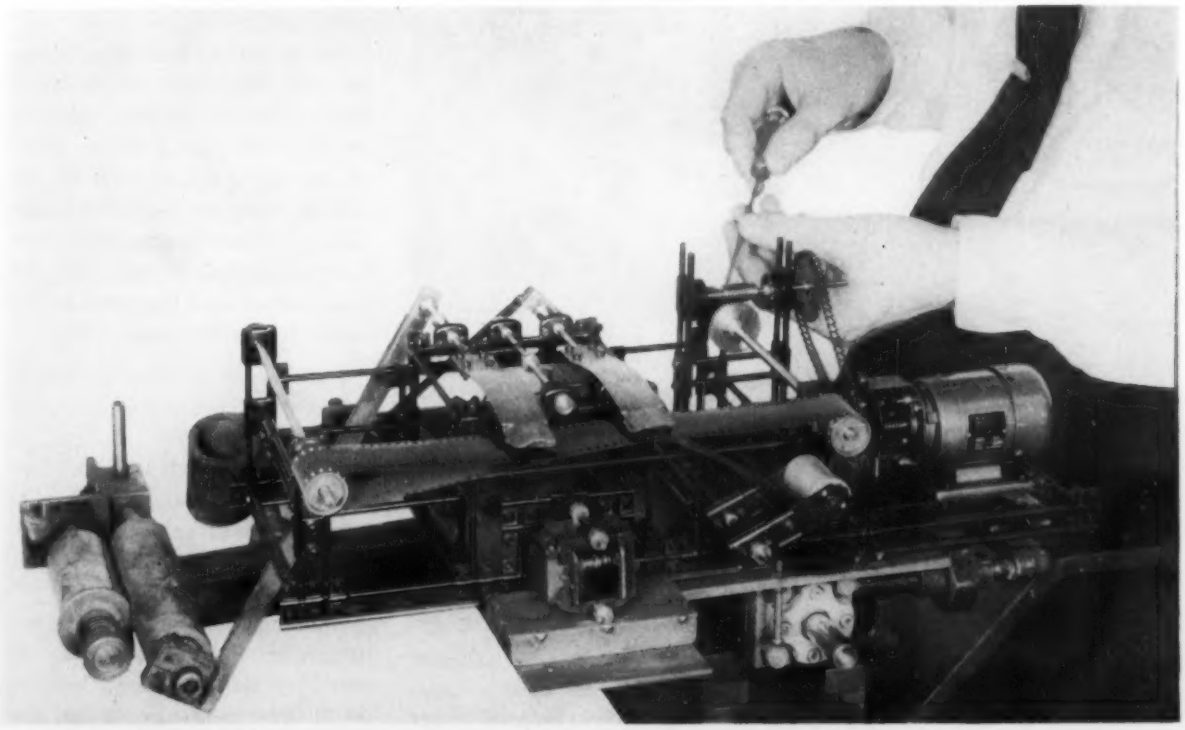
Kit Solves Problem—Many firms solve this problem with a precision model-engineering kit. Known as the FAC kit, it contains 4700 parts. Built in Sweden, it is an engineering tool developed to reduce design time, cut prototype costs, and prove or sell ideas and finished designs. With it, almost any mechanical design concept can be modeled quickly, inexpensively, and in full functional detail.

There are 150 basic construction elements in each kit. Built around a common dimensional module they can be assembled into an infinite number of mechanisms and structures.

Key items in the kit are round rods and beams which may be coupled in various ways to make structural frameworks for actual working mechanisms. Other basic elements include reinforcing plates, bearings, shafts, springs, gears, wheels, levers and sprockets—all of which fit into the modular scheme.

Builds Entire Device — The kit is much more than a toy, as engineers at the Expert Welding Machine Co., Detroit, recently demonstrated. Selecting various components from their kit, they built a full-size tracer control system for a welding machine and actually integrated it with an existing machine to handle a production job.

In building the tracer unit, they



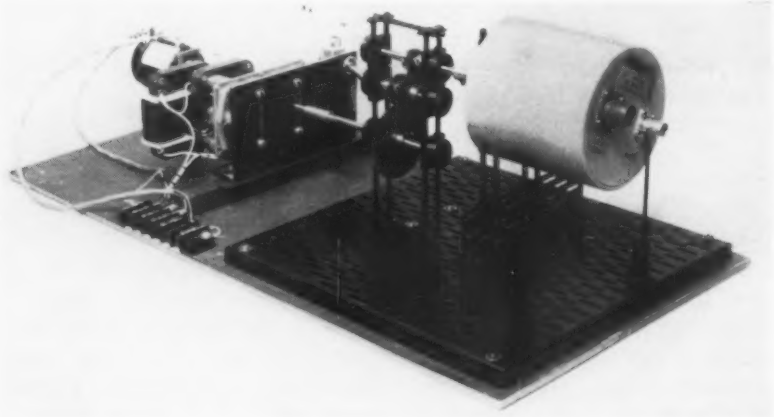
MORE THAN A MODEL: Tape controlled unit used in actual production to trace welding line on automobile frames was built up from a FAC construction kit by Expert Welding Machine Co. engineers.

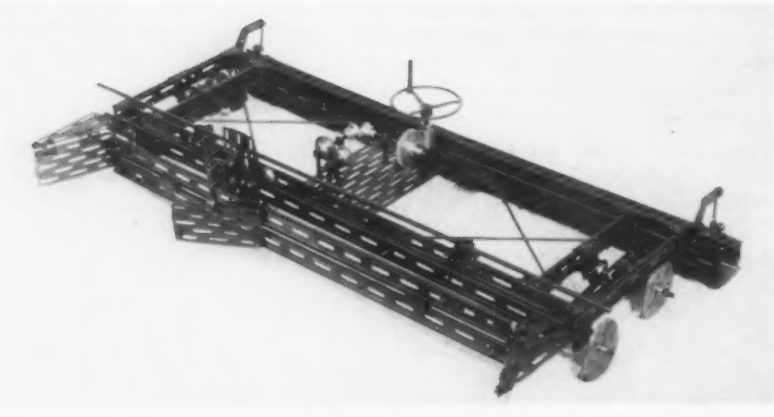
drew liberally from the supply of hundreds of kit parts to make spot changes in design as the need arose.

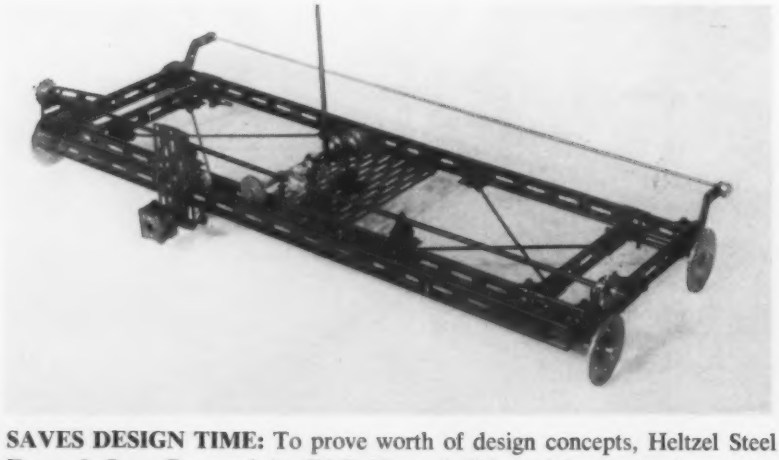
Based on the company's previous experience, time saved by skipping paper designs and building the prototype directly amounted to about 500 hours. The success of this tracer unit helped the company sell over $300,000 worth of welding machinery before a single complete design appeared on paper.

Aids Space Research—In Cleveland, Thompson Ramo Wooldridge Inc.'s space research scientists and design engineers also use kit-built animated models in many ways: to study problems of space flight, to illustrate new design concepts, and to make proposals based on these designs. The models are also used at industrial and military exhibitions to show the latest developments in space-age technology.

In the TRW program, for example, scientists built a model of the solar system to study space-flight problems involving planetary relationships. The model planets have gear-driven orbits, and their rotational speeds are extremely accurate in relation to the speed of the earth's rotation.







SAVES DESIGN TIME: To prove worth of design concepts, Heltzel Steel Form & Iron Co. used its FAC kit to build models of: (top) a servo balance mechanism for proportioning batches of concrete and other materials; (center) a paddle-type machine for spreading concrete in highway construction; (bottom) a machine to spray road-curing compound.

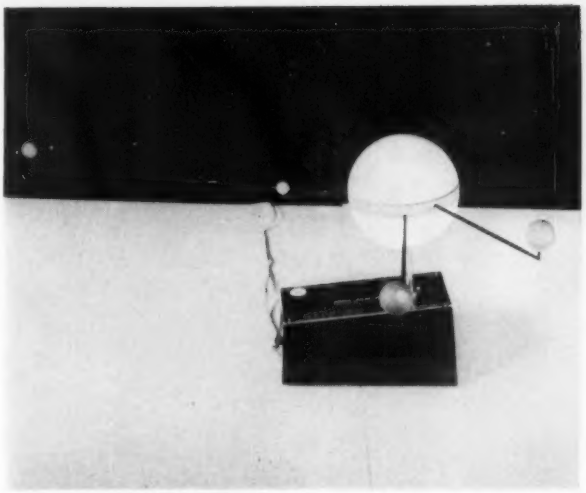
Develop New Designs — Many companies and colleges find FAC kits to be useful as instructional aids. For example, in a General Electric Co. training course at Schenectady, models teach students various ways of solving design-development problems.

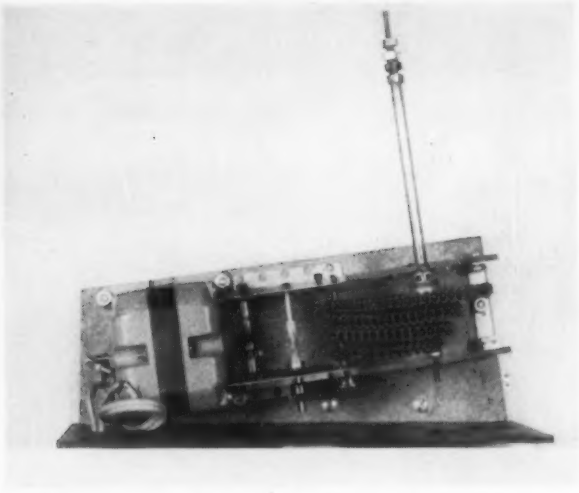
One such model demonstrates the use of a differential transformer in a process gaging system which measures variations in the width of strip steel.

Among many other examples, the company has also used its kit to built a differential gear assembly for a special output device. None of the many models built in this training program take more than a few hours to assemble. When they have served their purpose, they are disassembled and the parts are returned to the kit case.

Colleges Show How—Colorado School of Mines, Stanford University, and Waterloo College of Canada are but a few of the engineering schools using these kits to help students understand the principles of various machines, motions, and drives.

Model mechanisms help students to visualize all elements of even the most complex functions, and to retain this knowledge. They also help instructors to cover more ground in a given amount of time.





PLANET PLOTTER: Solar system model built at Thompson Ramo Wooldridge Inc., uses kit components and concentric shafts (right) to produce accurate relative motion of planets with respect to earth's rotation.

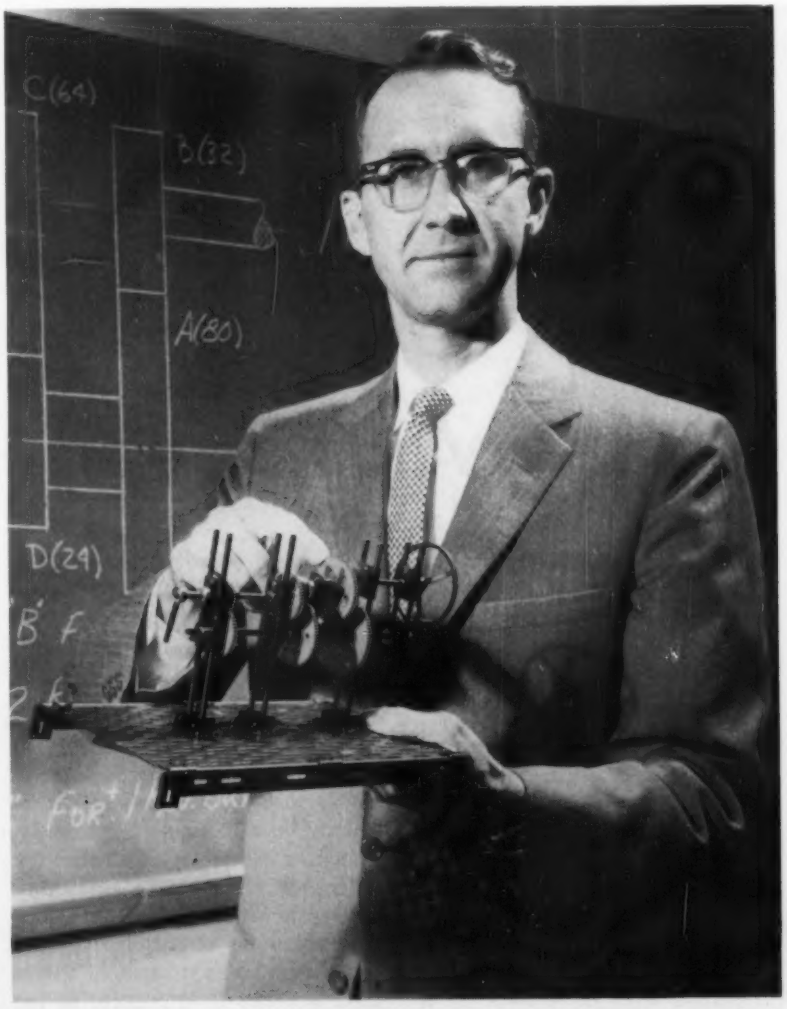
In still another area of usefulness, Heltzel Steel Form & Iron Co., Warren, O., uses its model construction kit to test new design ideas for heavy equipment.

Test New Theory—For example, a design concept for an improved highway building machine envisioned a series of paddles at the front end of the unit. The theory was that the paddles would permit a more even spreading of piles of concrete dumped from mixer trucks.

Company engineers built a model of a paddle-equipped machine to test the theory. It worked, thus confirming the soundness of the original idea. The same machine model also helped engineers to design drive mechanisms, trusses and beams for the full-size machines now being built.

Heltzel has also used its kit to help design two other types of equipment: (1) a chemical spraying machine, and (2) an accurate servo balance weighing machine for mixing batches of concrete.

In all cases, by launching directly into the building of model prototypes, engineers were able to test their design theories much more quickly and inexpensively than they had in the past.



STUDENT AID: Engineering schools use FAC kits to demonstrate principles of machines and drive mechanisms. Students learn faster this way.

PUTTING IT ACROSS: Chrysler's J. L. Gilmour explains air-suspension detail with aid of graphic illustration.

Graphic Aids Speed Planning

Success of a new design can depend on making it clearly understood by all concerned.

Graphic illustrations can put concepts across even to those rusty at reading blueprints.

▪ While the most widely used graphic form used by industry is the mechanical or orthographic drawing, there's a special form of graphics aimed directly at the general problem of planning, manufacturing and sales. It's a three-dimensional perspective drawing known as a "graphic illustration."

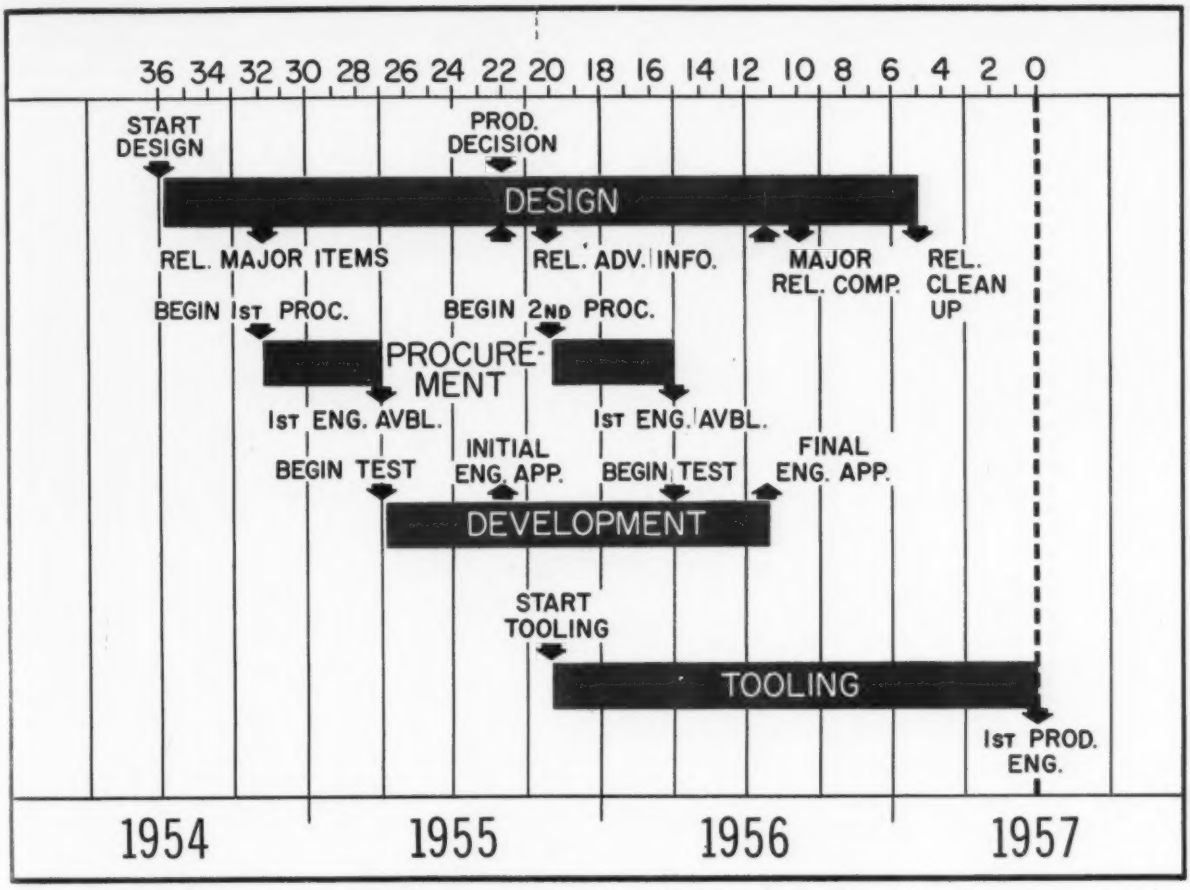
Explained in words, some ideas don't sound practical, but good illustrations can make them look feasible. For example, take the automotive torsion-bar front suspension developed by Chrysler Corp., Detroit.

Gets Concept Across—As J. L. Gilmour, assistant chief engineer of the company's Engineering Div., remarked in a recent talk before the American Society for Engineering Education, "I am sure that every one . . . with the aid of a series of illustrations of this type plus a few words of explanation would have a pretty good concept of the suspension in a few minutes."

"And what is often very important to us in planning, you would all have the same concept of it."

The current pace of frequent and extensive changes in automobile design could never be realized without a sizable planning operation. Here graphic illustrations become an indispensable aid to fast, thorough and uniform dissemination of engineering information.

Aids Decisions—The proposed suspension must be clearly presented to those who must make many important decisions. In addition to describing the physical construction of a new design, engineering must sell the benefits and advantages of a new proposal.



KEY IN TIMING: Each step in engine program fits into schedule. Bar graphs point up importance of timing.

An explanation with only an orthographic layout available (in this case an 18-ft spread) requires a study of the layout area by area for proper visualization. A graphic presentation on the other hand gives everyone concerned a uniform conception of the proposed design.

Such has been the case in explaining the anti-dip feature of Chrysler's suspension. It was always a problem to describe and often would have been passed over for lack of comprehension if it were not for the aid of graphics.

Points Up Timing—Timing is the next factor in planning. A dressed up version of a bar graph impresses all levels of management that the time to begin activity on a certain 195X program is now.

It reminds all concerned that important decisions are required at key points and gives them an opportunity to be properly prepared. Finally it emphasizes that programs overlap so that one cannot be "cleaned up" before starting another.

In addition to establishing a framework for an over-all program, the same graphic technique applies to individual elements and to separate development projects.

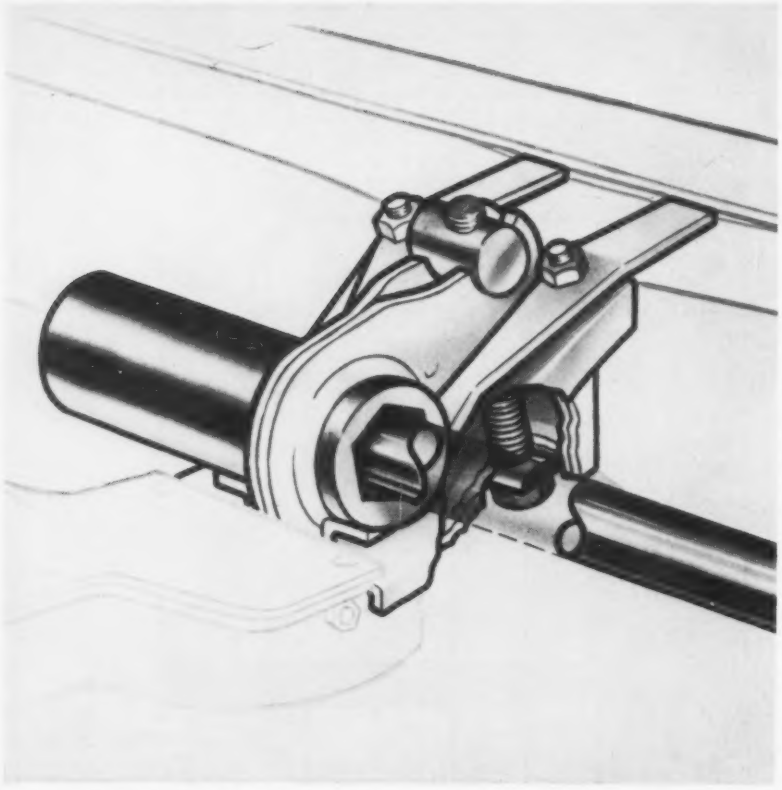
Widespread Use—In estimating and analyzing manpower requirements, product cost trends, weight trends, and the many other areas, a graphic presentation helps achieve a faster more thorough understanding of the program. It's essential to effective initial planning of a program and a valuable aid to insure that the program is carried out according to plan.

In the manufacturing phase, most of the same techniques apply. Graphic illustrations often are the best means of supplying advance information to those who are responsible for planning manufacture of the product.

Instead of countless calls from many different individuals in manufacturing to engineering personnel, these graphics tell an effective story to keep individual inquiries to a minimum.

For Production Assembly — These same graphics are later expanded into more detailed illustrations including part numbers and assembly instructions. Reduced to 8½ x 11 in. size, they form a production assembly manual.

A complete book containing all the information on what goes into an automobile and how it should be assembled can be carried under your arm. In the form of ortho-



HIDDEN DETAILS: Graphic illustration spots position of adjustable rear torsion bar anchor that is normally hidden from view.

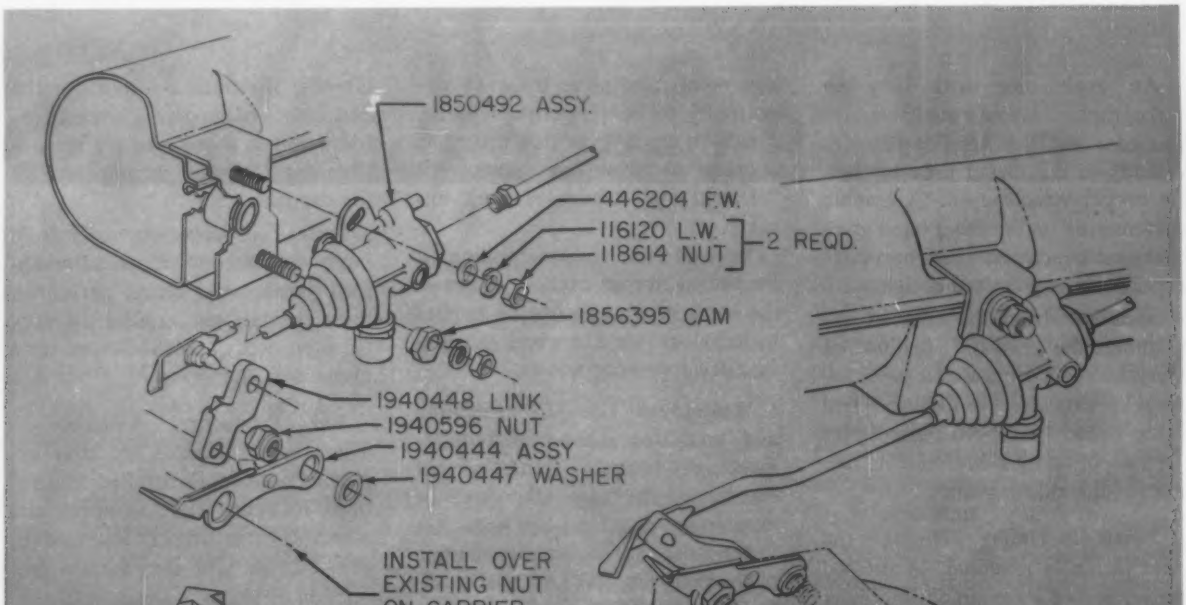
graphic drawings, it would require a fair-sized truck.

The principal benefit is the time saved by the efficiency with which the information can be assimilated. Given time, top supervision and tooling personnel could grasp the subject from regular drawings, but graphic illustrations can be taken in by all personnel.

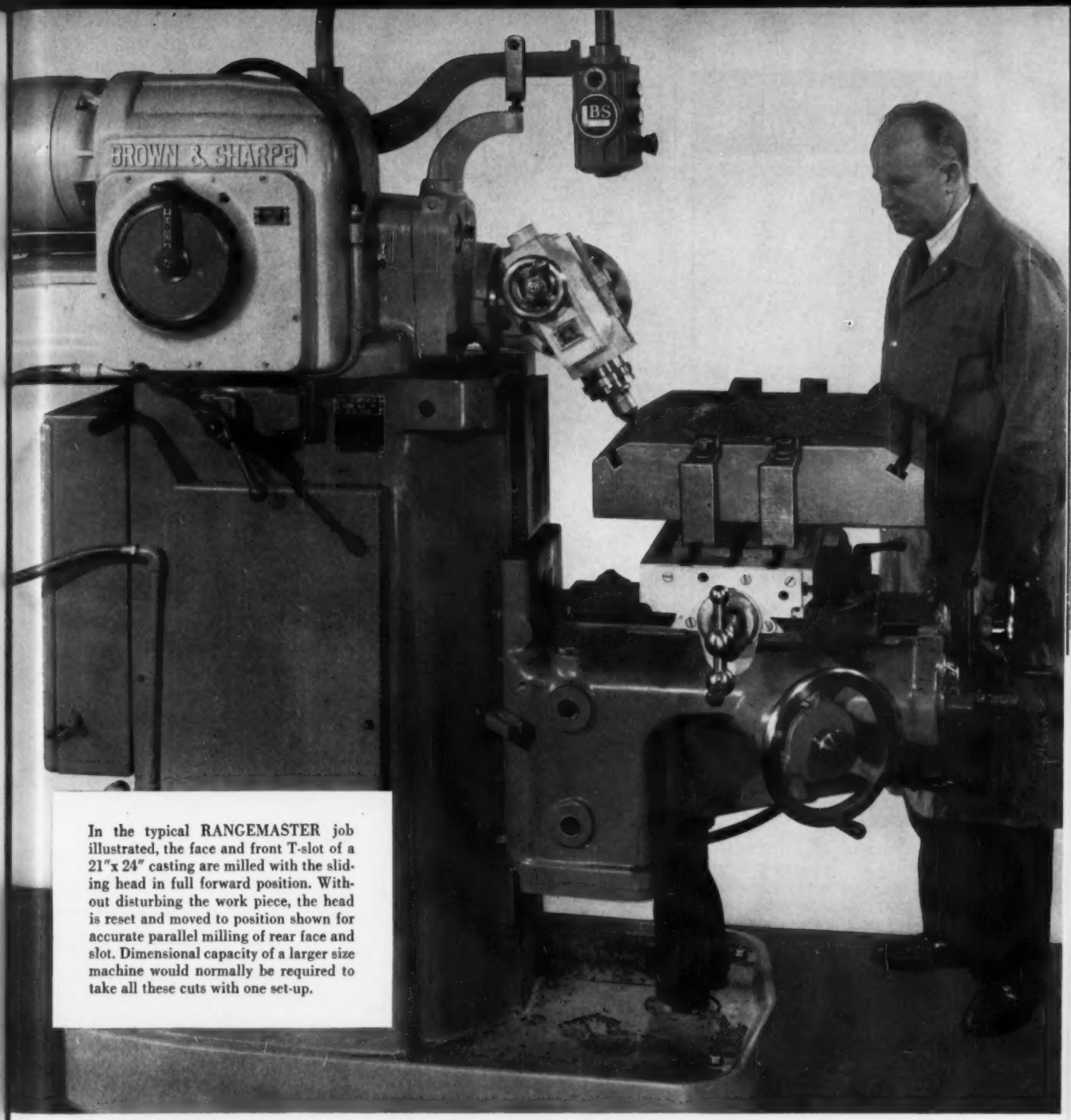
Post Near Work—Often the related graphic is posted near the point where the operation is performed. This type of instruction helps increase productivity and improves quality of product.

Graphs similar to those used in engineering are also used in the manufacturing area. They aid planning and scheduling tooling programs and recording costs, quality and production performance.

Since one of the major uses of graphics is to sell ideas in engineering and manufacturing, it fits in the sales field too. Its effectiveness in presenting marketing information, particularly statistical data, is outstanding.



HOW TO INSTALL: It's easy to visualize how to install this leveling valve from exploded and assembled views.



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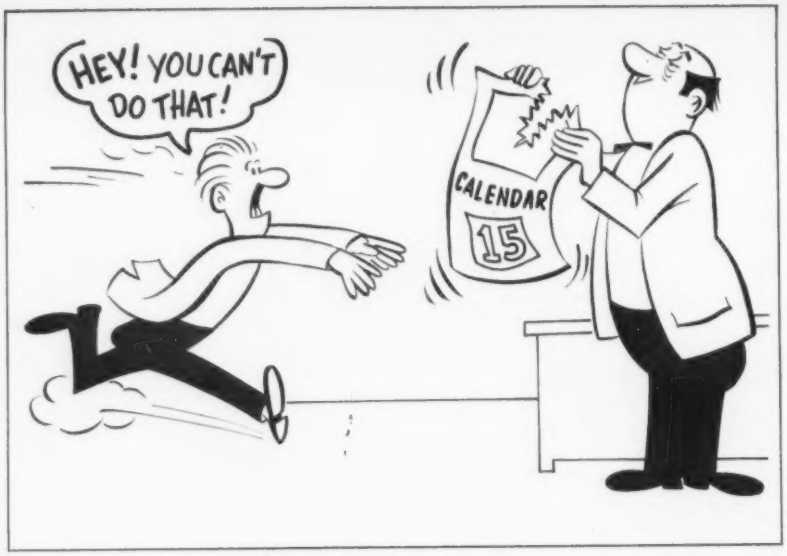

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WHAT IS A CUSTOM?

From the files of
The American Arbitration Association

■ In 1940, a nonferrous smelting and refining company in Connecticut began a continuous workweek, with employees working Saturdays and Sundays as part of regular rotating shifts. This continued for seven years, when the system was changed to a Monday-through-Friday schedule, with premium rates for week-end work when employees were called in. This system was in effect when the union was recognized in 1954.

In 1957, when the company decided to revert to the old system, the union objected. "You can't do this without negotiating the change with us," said the international representative. And he cited a contract clause which read:

"Working practices and conditions established by custom and in effect prior to this agreement shall not be changed without mutual consent."

But management had a different interpretation. "That clause means we can't set up operating procedures that were never in effect before," the personnel manager explained. "It doesn't stop us from reinstating a system that was in effect for about ten years."

The union wasn't convinced, and the case eventually went to arbitration under the rules of the American Arbitration Assn. **How would you rule?**

The Arbitrator Ruled:

"This union has been the bargaining agent for the employees here since 1954. It seems most logical to the arbitrator that a work schedule from which there has been no deviation for a period of seven years prior to the date of the first contract with the present bargaining agent, and for a total period of ten years before a change is sought in it, has been 'established by custom.' For that reason, the arbitrator believes that the action of the company in changing the work schedule of the employees was improper."

CAUTION: The award in this case is not necessarily an indication of how arbitrators might rule in apparently similar disputes. Each case is decided on the basis of the particular history, contract, testimony and other facts involved. Some of these essential details may have been omitted in condensing the original arbitration for brief presentation.

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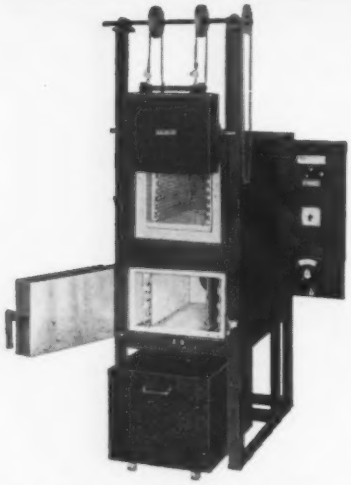

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For free copy circle No. 2 on postcard, p. 165

Finishing Media Bins

New bins and pans designed for convenient storage and handling of all barrel-finishing media are completely described in a two-page bulletin. Time and labor savings are explained. (Techline Div. of Wheelabrator Corp.)

For free copy circle No. 3 on postcard, p. 165

Steel Check Sheet

A "Steel Inventory Check Sheet" is designed to help steel users analyze their various inventory practices. A section entitled "Analyzing Inventory Costs" shows how the storage factor adds an average of 20 pct to the steel purchaser's invoice price. (Solar Steel Corp.)

For free copy circle No. 4 on postcard, p. 165

Dust, Fume Control

Sixty different plant installations are illustrated in a dust and fume controls systems catalog. Systems in the ceramic, foundry, metalworking, and steel industries are included. A wide range of systems in diverse applications is presented to show the author company's versatility in the field. Wet, dry, centrifugal, and electric collection are all shown. (The Kirk & Blum Mfg. Co.)

For free copy circle No. 5 on postcard, p. 165

Packaging Guide

Helpful information on selection of the proper corrugated packaging for a new or existing product is detailed in a 32-page book. Basic and special corrugated box designs are covered. (Hinde & Dauch Div., West Virginia Pulp and Paper.)

For free copy circle No. 6 on postcard, p. 165

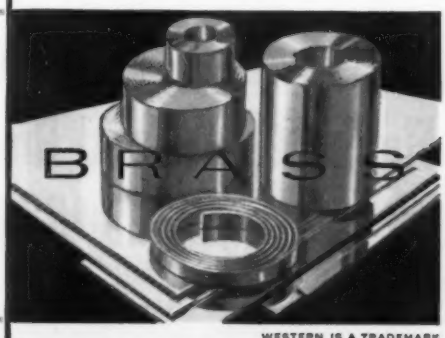
Silicone-Base Finish

A high-heat-resistant finish, said to be heat-stable up to 1000°F, is fully described in a brochure. Containing a base of silicone resins, it is highly resistant to heat, moisture, oxidation, and ultravoilet radiation. Several successful missile, aircraft, and industrial applications are discussed. (Midland Industrial Finishes Co.)

For free copy circle No. 7 on postcard, p. 165

BRASS

...especially Western Brass...
has done...is doing...
and will do...many jobs better than
any other metal. Western Brass
is "tailor-made" for
each job.



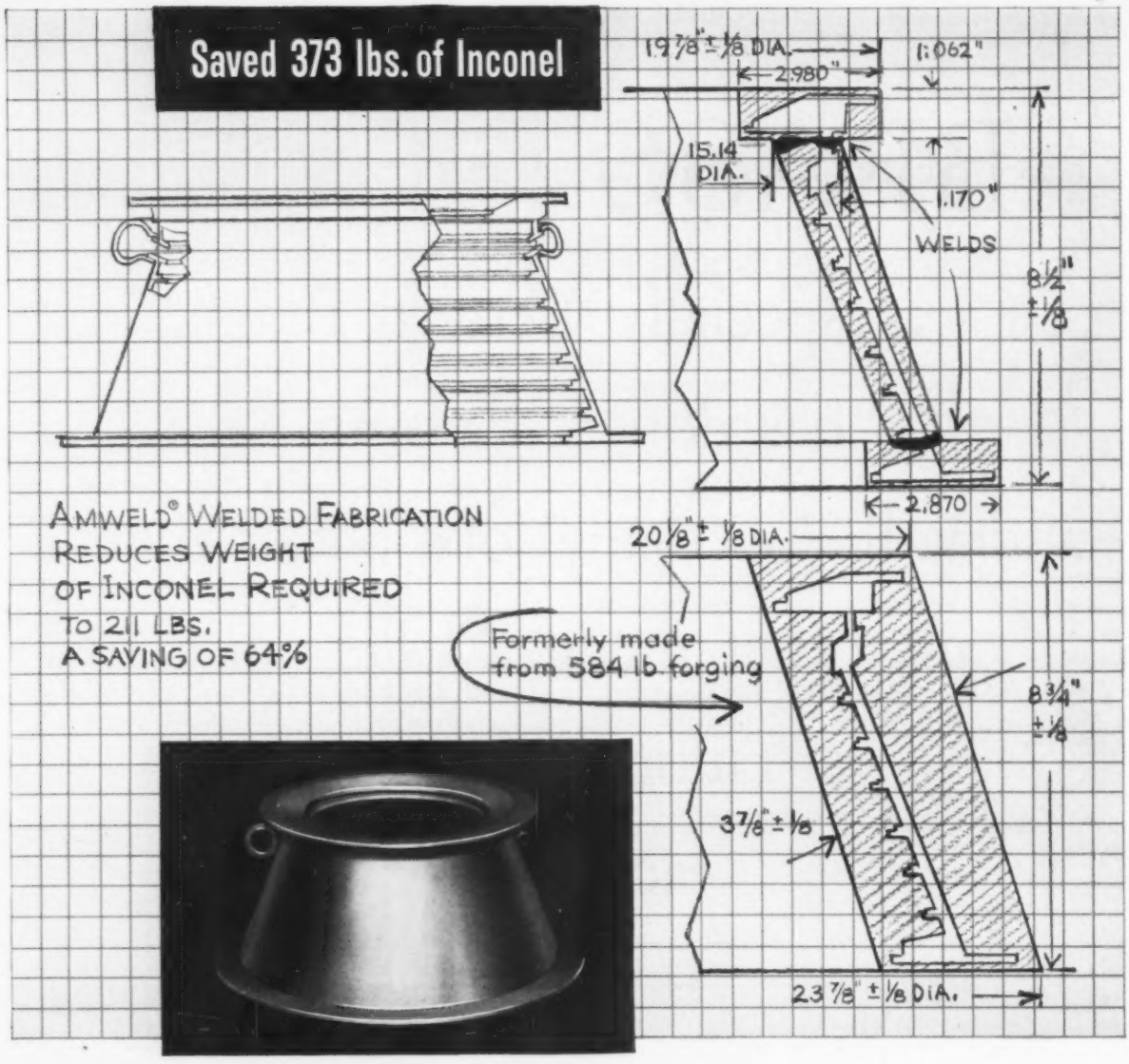
WESTERN IS A TRADEMARK

*** Sheet and Strip Specialists in Brass and Copper ***

The man from Western is only a phone call away

OLIN MATHIESON CHEMICAL CORPORATION
Western BRASS

MILLS: East Alton, Ill., New Haven, Conn. • SALES OFFICES: Boston • Chicago • Cincinnati • Cleveland • Dallas • Dayton • Decatur, Ga. • Detroit Grand Rapids • Indianapolis • Long Island City • Los Angeles • Milwaukee • New Haven • Philadelphia • Rochester • Rockford, Ill. • Saint Louis



Flash Butt-Welded Ring Assembly Replaces Heavy Forging
SAVES $820.60 on Jet Turbine Casing

This jet engine turbine casing is now produced by Amweld from 3 flash butt-welded rings circumferentially welded together. The result: $820.60 in expensive metal saved on each assembly . . . plus additional savings in machining.

Perhaps Amweld's 40 years' welding experience and special skills in working with hard-to-weld metals can help you solve a fabricating problem.

Send for new catalog of Amweld Welded Precision Assemblies and our instructive booklet, "How Amweld Flash Butt-Welded Rings are Produced." Better yet, mail us your prints and specifications. We will study your problem and work with you.

GET THE FACTS ABOUT AMERICAN WELDING

Complete information. Facilities brochure, Precision Assemblies Catalog, and booklet on "How Flash Butt-Welded Rings are Made."

THE AMERICAN WELDING & MFG. CO. • 120 DIETZ ROAD • WARREN, OHIO

AMERICAN WELDING

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Centrifugal Castings

Advantages, specifications, and some typical uses of centrifugally cast nonferrous alloy products are presented in a brochure. (Centrifugally Cast Products Div., The Shenango Furnace Co.)

For free copy circle No. 8 on postcard

Package Cushioning

A new cushioning material for packaging purposes, adaptable to die-cut and laminated packs or custom-made molds, is described in a pamphlet. (Armour Cushioning Products Div., A Div. of Armour and Co.)

For free copy circle No. 9 on postcard

Grinding Gages

A complete line of gages for continuous grinding is described in a 16-page catalog. Three new items are featured: gages for miniature OD, king-size OD, and ID. Special-use components are included. (Federal Products Corp.)

For free copy circle No. 10 on postcard

Synthetic-Tired Wheels

A four-page brochure describes features of a line of polyurethane-tired wheels designed for general industrial uses, stressing their strength and resilience. Diameters from 4 to 28 in. are available. (Disogrin Industries, Inc.)

For free copy circle No. 11 on postcard

Three-Powered Millers

Milling machines with power feed in all three directions are described in a bulletin. This feed is available on 1½- and 2-hp models. Push-button controls for sensitive adjustments of feed rates are incorporated. (Famco Machine Co.)

For free copy circle No. 12 on postcard

Corrosion Preventive

A tarnish and corrosion inhibitor which minimizes spotting out of copper and brass plate is described. One gallon of this non-toxic, non-chromate liquid treats 500 sq ft of metal. Solderability is improved, as is paint adhesion. A variety of uses are recommended. (Enthone, Inc.)

For free copy circle No. 13 on postcard

Low-Cost Boilers

An eight-page bulletin describes a new line of oil- and gas-fired, and combination oil-gas-fired, packaged automatic boilers. Data on models from 20 to 100 hp are furnished. Pressures up to 250 psi are available. (Orr & Sembower, Inc.)

For free copy circle No. 14 on postcard

Electric Cutter Grinder

A 40-to-1 increase in speed of metal removal from carbide milling cutters is possible with an electrolytic cutting attachment described in a four-page bulletin. An electrolytic fluid between cutter and diamond wheel disintegrates carbide in 20-thousandths passes. (Anocut Engineering Co.)

For free copy circle No. 15 on postcard

Power Presses

A two-page brochure supplies data on a line of power presses featuring a low-cost, efficient pneumatic clutch-brake assembly. (Famco Machine Co.)

For free copy circle No. 16 on postcard

Air Afterdryer System

An afterdryer system for drying and cleaning air to be used in compressed-air systems is described in a bulletin. Advantages over aftercoolers or desiccant filters are outlined, including elimination of much equipment and expense associated

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **5/14/59**

Circle numbers for Free Technical Literature, Design Digest, or New Equipment:

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FIRST CLASS PERMIT No. 36 NEW YORK, N. Y.

BUSINESS REPLY CARD

No postage necessary if mailed in the United States

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THE IRON AGE

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Company .....

Co. Address .....

.....

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FREE LITERATURE

with these systems. In addition to taking out moisture from air lines, the system can remove dirt particles of three microns, and oil vapor as well. Several types of systems for different removal uses are offered. A technical bulletin on the subject is also offered. (Wilkerson Corp.)

For free copy circle No. 17 on postcard

Dissolved-Oxygen Meter

A complete description and details of operation of a new dissolved-oxygen meter are contained in a package of product specification sheets. Descriptions are included of the three basic units making up the meter—a contact sampler, an analyzer, and a recorder. (The Hays Corp.)

For free copy circle No. 18 on postcard

Surface Plates

Granite surface plates and various surface-plate stands are cataloged in a 4-page bulletin. (The Herman Stone Co.)

For free copy circle No. 19 on postcard

Surface Grinders

Full line of abrasive surface grinders is described in a new catalog, which includes specifications and extra equipment. (Landis Tool Co.)

For free copy circle No. 20 on postcard

Punches and Dies

A 50-page catalog lists a complete range of round, square, and oblong punches, dies, and rivet sets. (Geo. F. Marchant Co.)

For free copy circle No. 21 on postcard

Pumps

Centrifugal and rotary pumps for a wide range of industrial uses are described and illustrated in a 72-page catalog. Ratings range from 1/20 to 5 hp, capacities from 1 pint to 148 gpm, and operating pressures from 0 to 54 lb psi. Special-use pumps, and pump parts and accessories, are included. (Pioneer Pump, Paris Products Div., Detroit Harvester Co.)

For free copy circle No. 22 on postcard

Grinding Wheels

A brochure outlines briefly the methods and equipment used by this company in the manufacture of abrasive wheels. (Blanchard Machine Co.)

For free copy circle No. 23 on postcard

Colloidal Dispersions

A four-page bulletin presents descriptions and application data on four colloidal dispersions for lubrication. Two are colloidal graphite dispersions, two are resin-bonded tetra-fluoroethylene films. Uses in molding and die casting, and elsewhere, are shown. (Acheson Colloids Co.)

For free copy circle No. 24 on postcard

Processing Furnaces

Versatile heat-processing furnaces, with high-velocity heat flow in electric- and gas-fired models, are described in a new literature sheet. Maximum temperatures to 1250°F are available. These furnaces, designed for accurate control and uniform application of heat, are applicable to all types of heat processing. (Despatch Oven Co.)

For free copy circle No. 25 on postcard

Heavy-Duty Hoists

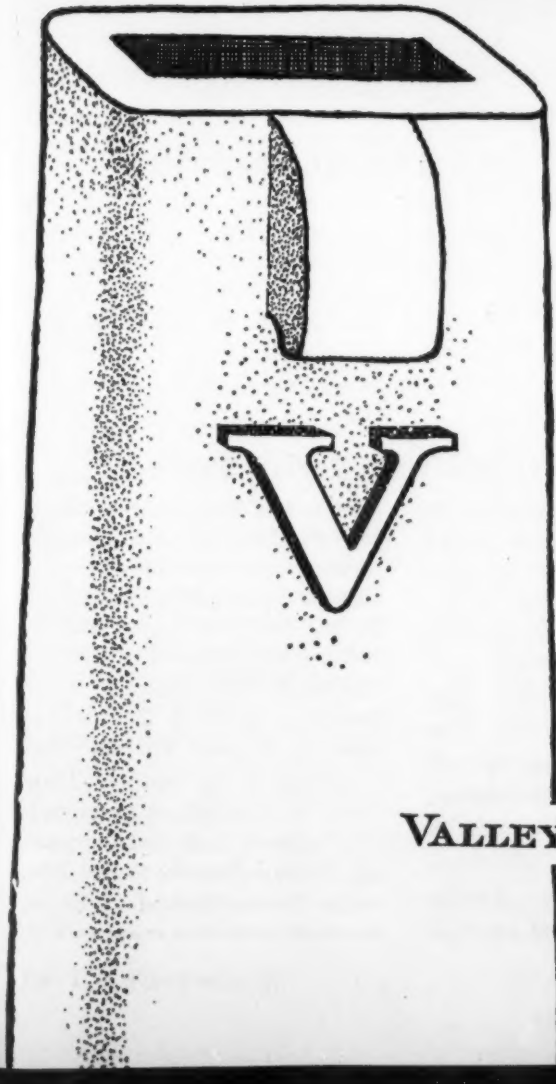
Complete data are presented in a 12-page bulletin on a line of low-headroom electric hoists. Capacities range from ½ to 10 tons, with four frame sizes available. Various mounting options are described. (Robbins & Myers, Inc.)

For free copy circle No. 26 on postcard

Carbide Cutting Tools

A revised 32-page catalog provides information and specifications on brazed tools, inserts, tool holders, and blanks. Two new indexable insert styles, and a "heavy cut" chipbreaker line are available. (Allegheny Ludlum Steel Corp.)

For free copy circle No. 27 on postcard



Tomorrow

we'll harness the energy of the sun .....

but even then

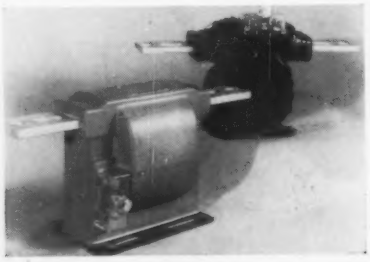
steel will be poured into

VALLEY INGOT MOULDS

VALLEY MOULD AND IRON CORPORATION

GENERAL OFFICES: Hubbard, Ohio
WESTERN OFFICE: Chicago, Illinois
NORTHERN OFFICE: Cleveland, Ohio

New Materials and Components



Molded Indoor Transformer Has High Ratings

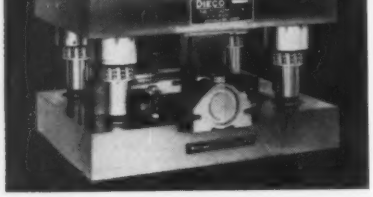
A polyester - elastomer molded current transformer comes in current ratings from 10 through 1200 amp. In replacing tape - insulated transformers of the 2500-v class, the molded unit has greatly increased mechanical and thermal ratings and is suitable for use under oil. The continuous current rating factor is increased so it will carry one and one-half rated current without overheating. (Westinghouse Electric Corp.)

For more data circle No. 28 on postcard, p. 165

Claw Handles Scrap That Won't Fit Buckets

A claw-like attachment can handle large loads of lathe turnings, light-gage blanking scraps, and other objects that do not easily conform to normal bucket-type handling. Hydraulically operated, it has a 1200-lb capacity and a seven-foot-high reach to allow for loading this type of material into normal open truck carriers or collecting it in high piles. (Yale Materials Handling Div., The Yale & Towne Mfg. Co.)

For more data circle No. 29 on postcard, p. 165



Ball-Bearing Die Set Is Efficient, Economical

A ball-bearing die set is available offering eight exclusive features to smooth operation, facilitate setup and maintenance, and assure long life. Positive alignment is assured. It is easy to assemble and disassemble. Pre-loaded ball bearings have "negative clearance," which prevent the die's shifting or breaking down even after extended use. Angled slots prevent "tracking" of balls. (Die Supply Div., E. W. Bliss Co.)

For more data circle No. 30 on postcard, p. 165

Fiber Glass Wires Break Up During Shakeout

Instead of handling, bending, reclaiming, and reforming wires and rods, coremakers can now reinforce intricate cores by using plastic "wires" that break up during shakeout. They are made from a cord-like resin-impregnated fiber glass material, available in diam sizes of 3/32, ⅛, and 3/16 in. The new material is clipped to the desired length, formed to the contour of the core section to be reinforced, and baked with the core. Another method is to form and pre-bake lengths into predetermined shapes and set them into the core like pieces of conventional core wire. Shaping and handling during coremaking are made easier, and reclaiming and reforming of wires are eliminated. The coefficient of expansion is equal to that of core sand, so the core will not crack away from the reinforcement. These "wires" will not adhere to the casting if exposed to the metal in pouring. (Federal Foundry Supply Div., Archer-Daniels-Midland Co.)

For more data circle No. 31 on postcard, p. 165

WELDING CLINIC

J. Imperati and R. F. Pulver, Welding Engineers
The American Brass Company, Waterbury, Conn.

Give worn equipment a new lease on life by surfacing with Anaconda Welding Rod

Anaconda Welding Rods are widely used in production and maintenance operations in the manufacture of all types of mechanical equipment and consumer goods. Familiar uses are the joining of iron and steel parts by oxyacetylene braze welding and the oxyacetylene braze-welding repair of broken machine parts. Of equal importance is their value in overlaying iron and steel to reduce the friction of sliding surfaces, and in rebuilding worn surfaces to get continued usage from parts that would otherwise be scrapped. Anaconda-997 (Low Fuming) Bronze, Tobin-Bronze 481, and Nickel Silver-828 Welding Rods are useful for many such applications.

Oxyacetylene braze welding is employed for these surfacing and rebuilding operations because of its speed, efficiency, and the convenience of using the equipment and skills available in most job shops. The many advantages, which result from the low temperatures of application, include:

1. *Procedures which are virtually foolproof.* The molten bronze automatically tins out and fuses to the base metal when the latter reaches the proper temperature. The rate of heat input is low enough to permit excellent control of the weld metal, and deposits are easily built up even in the vertical position.

2. *Low residual stresses.* The overall heating that accompanies the process reduces temperature gradients and minimizes distortion.

3. *Economy in time* . . . frequently repair welds are made without dismantling equipment.

4. There is ***no embrittlement of*** cast iron due to high temperatures. Machinability is retained and cracking tendencies are eliminated.

5. *Absence of iron pick-up* in deposits made on iron and steel, thereby avoiding hard spots and cracks.

WORN SPINDLE for a 60-ton lathe repaired by building up worn surface with Anaconda Nickel Silver-828 Welding rod by oxyacetylene braze welding. The estimated saving over the cost of a new spindle was nearly $2500.

Surfacing operations which are regularly done with Anaconda Welding Rods include the overlaying of bearing surfaces on iron and steel, and the rebuilding of worn items such as pistons, shafts, valve mechanisms, gear teeth, bearing surfaces, propeller and impeller blades.

Details concerning the type of rod and procedures recommended for surfacing various metals are available in Publication B-13, "Anaconda Welding Rods."

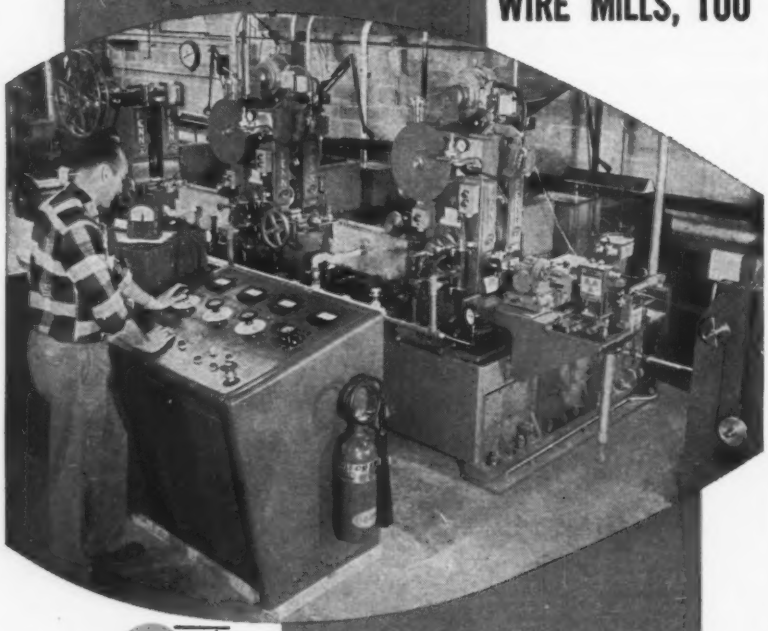
Free technical assistance. In most cases, Anaconda distributors can help you select the exact rod you need for your job. But if you have special problems, Anaconda welding engineers are at your service. For a copy of Publication B-13 with comprehensive information on Anaconda Welding Rods and procedures — or for technical assistance — write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 5977

ANACONDA®
WELDING RODS
Made by
The American Brass Company

FENN

Sets the Pace

WITH PRECISION TANDEM COPPER WIRE MILLS, TOO



FROM .129

TO .324 .0159

AT 1,000 FPM
IN ONE PASS

to these precision tolerances

± .0005" on width
± .00005" on thickness
± .001" on radii of edges

This Fenn line exemplifies the finest in high speed precision wire flattening. It was engineered and built by Fenn to produce from an entry round thin copper tape with critical dimensions at continuous production speeds in excess of 900 fpm. The installation consists of a Fenn Model 082 three stand tandem mill with separate DC variable speed drives. Each stand has carbide shell rolls with both internal and external cooling. Between stands are Fenn No. 51 power-driven edgers and coolant troughs. Exit tape is automatically gaged by electro-limit width gage and Beta Ray thickness gage. Tension and speed synchronization are regulated by dancer roll controls between stands, and at exit end to synchronize the take-up reel which must traverse wind the tape with great precision for the next operation.

Fenn engineers welcome the opportunity to design and build precision mills and related material handling accessories and instrumentation to your exact product requirements. Fenn Wire Flattening Lines are production tested and proven. They incorporate advanced engineering features and versatility found in no other rolling mills. Fenn users enjoy the competitive advantages of greater production resultinn from higher rolling speeds, and closer tolerances. Comprehensive catalog will be sent upon request.

THE FENN MANUFACTURING COMPANY • 303 FENN ROAD, NEWINGTON, CONN.

DESIGN DIGEST

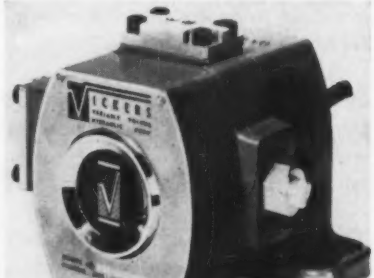
High-Heat Alloys

A series of columbium - base alloys, with high - temperature strength, is announced. Of the two now commercially available, one is a columbium-zirconium alloy, the other, a columbium-tantalum-zirconium alloy. Melting points are well over 4000°F, and respective densities are 8.6 and 10.26 g per cc. They are easily fabricated at ambient, easily welded, and resistant to oxidation. Ultimate tensile strengths are 30,000 psi at 2000°F and 12,000 psi at 2400°F. (Fansteel Metallurgical Corp.)

For more data circle No. 32 on postcard, p. 165

Hydraulic Pump

For industrial uses, this variable delivery 5-gpm vane pump includes an integral pressure compensator. The compensator controls pump volume at preselected adjustable pressures. Designed for up to 1000-psi pressures, the new pump limits its delivery to system demand. Maximum delivery can be limited



by means of a mechanical adjustment. Pressure compensation can be varied from 200 to 1000 psi. Sharp cut-off characteristics let the pump deliver nearly full volume up to the compensator setting even at low operating pressures. Variable volume and pressure compensation features eliminate a relief valve and attendant piping. (Vickers, Inc.)

For more data circle No. 33 on postcard, p. 165

Silicone Grease

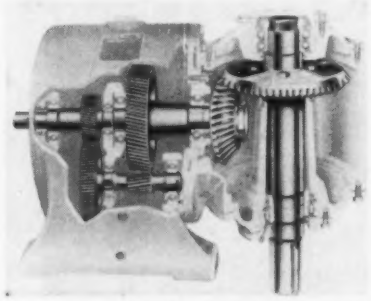
A new silicone grease designed as a rust inhibitor and lubricant for

mated ferrous components and fabricated rubber parts is available. Easy to apply, it is consistent from —75° to 300°F, and serviceable in many applications where other greases would solidify, oxidize, evaporate, or bleed. (Silicone Products Dept., GE)

For more data circle No. 34 on postcard, p. 165

Right Angle Head

This universal-mounted right angle head adapts to speed reducers and gearmotors. The right angle attachment can be furnished in horizontal, vertical or intermediate positions with single or double extended shafts. It features spiral bevel gearing precision cut from alloy steel forgings. Case harden-



ing assures high strength and durability. Each set of gears is matched and lapped after hardening. This insures precise contact and quiet operation. Conservatively selected bearings, husky output shaft and a wide bearing span provide ample overhung load capacity for chain, pinion and belt service. (Western Gear Corp.)

For more data circle No. 35 on postcard, p. 165

Stops Corrosion

A zinc-rich liquid, brushed or sprayed, stops rust and corrosion on ferrous metals and welded joints. One gallon covers 400 sq ft with a 95-pct-zinc film that provides complete protection, even against salt water. (American Solder & Flux Co.)

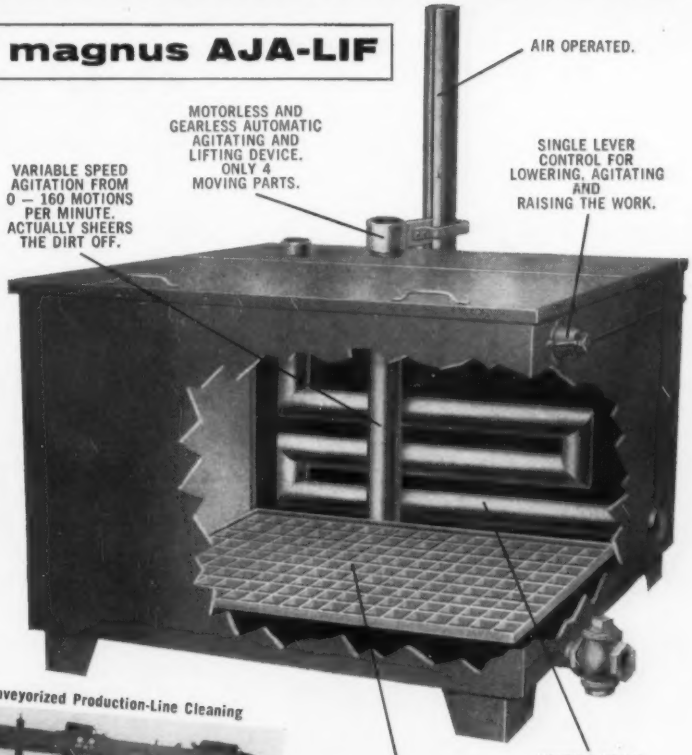
For more data circle No. 36 on postcard, p. 165

Water-Soluble Coolant

A new water-soluble metalworking coolant stops rusting, resists rancidity, and reduces the threat of

THE CLEANING MACHINE THAT GROWS WITH YOU!

magnus AJA-LIF


AIR OPERATED.
MOTORLESS AND GEARLESS AUTOMATIC AGITATING AND LIFTING DEVICE. ONLY 4 MOVING PARTS.
SINGLE LEVER CONTROL FOR LOWERING, AGITATING AND RAISING THE WORK.
VARIABLE SPEED AGITATION FROM 0 — 160 MOTIONS PER MINUTE. ACTUALLY SHEERS THE DIRT OFF.
HEATING UNITS FOR STEAM, GAS OR ELECTRICITY.
STANDARD GRATE (OR ROLLER) PLATFORM HANDLES UP TO 450 LBS. OTHER UNITS UP TO 2000 LBS.

Conveyorized Production-Line Cleaning

De-Centralized Cleaning

Batch Cleaning

FLEXIBLY ENGINEERED to offer you the time, labor and material savings of mechanically agitated cleaning **today** and **tomorrow**, the Magnus Aja-Lif adapts to current needs — never becomes obsolete.

- COMPLETE BATCHES CLEANED MORE THOROUGHLY THAN EVER IN MINUTES.
- VERSATILITY IDEAL FOR DE-CENTRALIZED CLEANING. USE WHEREVER YOU WANT ON-THE-SPOT AUTOMATIC CLEANING EFFICIENCY.
- SIMPLE CONVEYOR CONNECTS STANDARD UNITS FOR MULTIPLE STAGE OPERATIONS. WASH, RINSE, RUST-PROOF, ETC., AUTOMATICALLY, SKIPPING STAGES WHENEVER DESIRED.

YOU OWE IT TO YOUR FUTURE to find out about the benefits which the Aja-Lif offers TODAY!

MAGNUS CHEMICAL COMPANY
46 South Avenue
Garwood, New Jersey

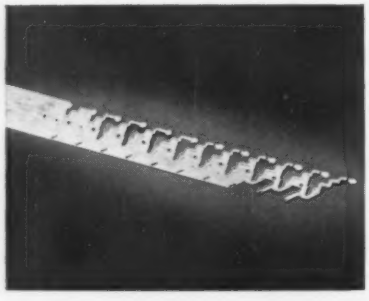
PLEASE SEND FULL INFORMATION ON YOUR MAGNUS AJA-LIF CLEANING MACHINES.

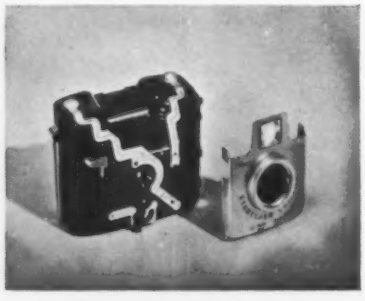
NAME _____
COMPANY _____
POSITION _____
ADDRESS _____
CITY _____ STATE _____

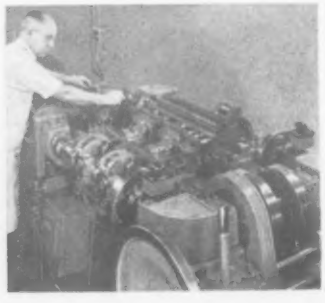
magnus CHEMICAL COMPANY INC
EQUIPMENT • CHEMICALS • METHODS

A WORLD-WIDE ORGANIZATION SPECIALIZING IN THE CLEANING AND PROTECTION OF ALL SURFACES.

U.S. MULTI-SLIDE® CONTRIBUTES TO SUCCESS OF KODAK BROWNIE STARFLASH!







Manufacture of a reliable, practical camera, with a built-in flash, that will sell at a popular price calls for considerable engineering skill and technical know-how. It calls for good design and sturdy construction. It demands consistently accurate production — unwavering accuracy at high speeds. ● Eastman Kodak Company has been using U.S. Multi-Slide Machines for many years and has found them satisfactory in high volume production of irregularly shaped parts. Parts are manufactured without intermediate handling or secondary operations that would have been required by conventional methods. Presently, Eastman Kodak Company's Apparatus & Optical Division uses U.S. Multi-Slides for the production of no less than six parts for Brownie Star Cameras; the Starflash, Starflex and Starlet. ● A Model #33 U.S. Multi-Slide is used to produce battery connectors for the Brownie Starflash. The machine is arranged with multiple rams and tooling with three separate die stages — producing a completed part at each cycle. ● Because of their versatility, the U.S. Multi-Slides could be readily adapted by Eastman Kodak's A. & O. Division to manufacture other flat stock stampings, wire parts, or the simultaneous feeding and processing of more than one strip to complete an assembly. Prefabricated parts could be hoppered, positioned and assembled to the stamping being made in the machine. ● **Write today to find out how U.S. Multi-Slides can produce your stamped components better and more efficiently . . . ask for Bulletin #15-I or send in samples or drawings of the part you want produced.**

ILLUSTRATED ABOVE: The popular Kodak Brownie Starflash Camera . . . **LEFT TO RIGHT:** Successive stages in the production of Brownie Starflash Battery Connectors as stamped by U. S. Model #33 Multi-Slide . . . Brownie Starflash Camera disassembled (built-in flash removed) to show location of battery connector produced on a #33 U. S. Multi-Slide, part of flash synchronization circuitry . . . U. S. Multi-Slide Model #33 in use at Eastman Kodak Company's Apparatus & Optical Division in Rochester, New York . . . Machine is turning out battery connectors for the Brownie Starflash Camera.

U. S. TOOL COMPANY, INC. AMPERE (East Orange) NEW JERSEY

U. S. Multi-Slides® • U. S. Multi-Millers® • U. S. Automatic Press Room Equipment • U. S. Die Sets and Accessories

MULTI-SLIDE

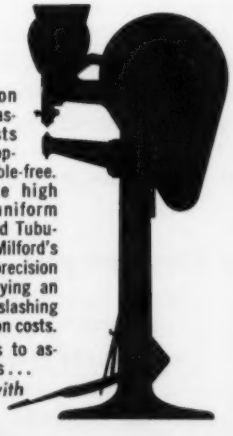
AUTOMATIC ASSEMBLY

IS FAST,

ECONOMICAL,

TROUBLE-FREE

with Milford tubular rivets and automatic riveters



Mass production and automatic assembly cut costs only when all operations are trouble-free. That's why the high strength and uniform quality of Milford Tubular Rivets, plus Milford's wide line of precision riveters, are playing an active role in slashing today's production costs.

For the answers to assembly problems... *get in touch with Milford first!*

THE MILFORD RIVET & MACHINE CO.

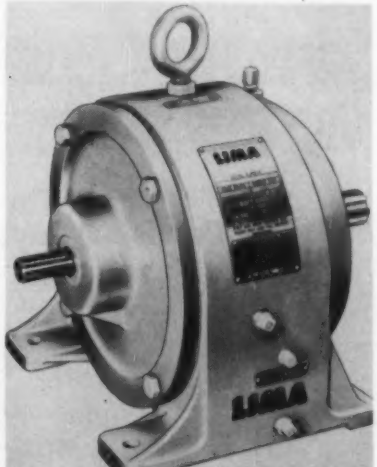
MILFORD, CONNECTICUT • HATBORO, PENNA.
ELYRIA, OHIO • AURORA, ILL. • NORWALK, CALIF.

dermatitis. It stays clean, extends tool life, and improves finishes as much as 10 microinches. Tool life has been increased up to 80 pct. A special formula makes the solution hug the metal, cooling even more effectively than water and permitting substantial increases in speeds and feeds. (S. C. Johnson & Son, Inc.)

For more data circle No. 37 on postcard, p. 165

Speed Reducer

Straight-line speed reducers just introduced are foot-mounted, flange-mounted or flange-mounted with an extended housing. All have 5.06:1 to 1478:1 ratios. Capacities are 0.077 to 147 hp. Output speeds range from 0.49 to 350 rpm. Built with rigid cast housings of unit case design, the reducers aren't distorted by overhung loads, uneven mounting surfaces or accidental impact. Such construction assures permanent, accurate alignment of shafts, gears, bearings and seals. For inspection or ratio change, disassembly is simple. It requires removal of the endbell only. This can be done in minutes without disconnecting the reducer from the load. Bearings have extra capacity for long, trouble free service under severe conditions. Oil mist lubrication insures long life to gears, bearings and seals. (Lima Electric Motor Co., Inc.)



For more data circle No. 38 on postcard, p. 165

CONTROL!

Ever figure out how much time it takes to jockey a big work-piece into exact position for forging, machining or some other operation?

You can cut that time substantially by operating the crane *from the floor* with FEMCO CRANE CONTROLS.

Femco Controls operate over existing power circuits, by employing a carrier system. Control stations may be located at fixed points, or mounted on wheels to be moved around as desired.

You can have a system by which all crane movements are controlled by cranemen permanently stationed on the floor, or a system which permits the man on the floor to take control for the last few moments when positioning becomes critical.

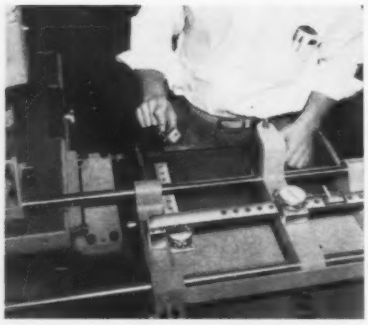
Wherever there is an overhead crane, there is a strong probability that FEMCO CRANE CONTROLS will more than pay their way through the time they save.

V3A 6447

Femco, Inc. Irwin, Pa.

COMMUNICATIONS: Carrier and wired audio systems. **TELEMETERING:** Flows, pressures and other functions. **MONITORING:** Circuit breakers, valves, pumps, compressors, etc. **REMOTE CONTROL:** Pumps, valves, circuit breakers, cranes, or other moving equipment.

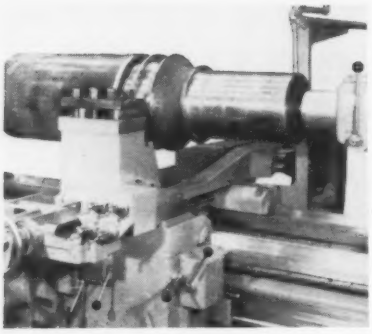
New Equipment and Machinery



Two Additions Improve Punch-Press Efficiency

A microbar gaging assembly and a new toggle-switch control mechanism increase the convenience and efficiency of these high - speed, quick-change punch presses. The microbar assembly enables production of templates or single pieces to close tolerances. Stops are set to the nearest inch, and micrometer adjustment moves the carriage to desired final position. This automatically positions the work on the fabricator table, and the machine is tripped to punch the hole. The new toggle-switch mechanism cuts changeover time between template punching (foot treadle) and production punching (automatic). (Wales-Strippit, Inc.)

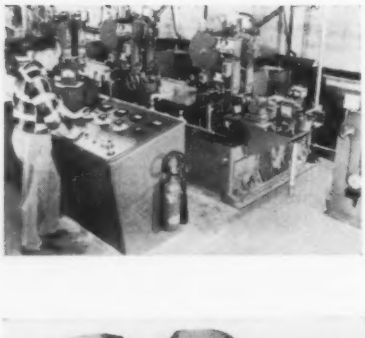
For more data circle No. 39 on postcard, p. 165



Contour-Machines 33-in. diam Mill Shape Rolls

A new hydraulic roll duplicating lathe accurately contour-machines mill shape rolls up to 33 in. in diam. It uses a template-controlled hydraulic duplicating mechanism and a 90° tool slide, which handles all roll tracing work. Carriage feed is continuous, and feed rate varies automatically and continuously as steepness of contour varies. A stepless generation of roll contours results, and finish or touch-up cuts are eliminated. Any desired contour can be generated, and roll necks may be turned by tracer control. A lever converts the lathe instantly to standard engine-lathe operations. (The American Tool Works Co.)

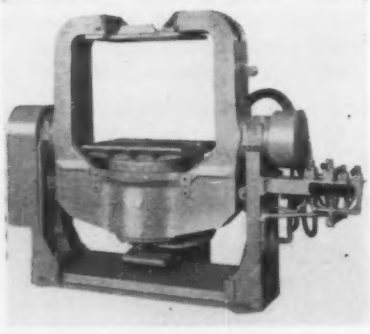
For more data circle No. 40 on postcard, p. 165



Produces Precision Copper Tape at 1000 fpm

From an entry round of 0.129-in. diam, a three-stand copper wire mill produces copper tape to critical dimensions at speeds up to 1000 fpm. Exit tape is 0.324 x 0.0159 in. ±0.0005 in. on width, ±0.00005 in. on thickness, and ±0.001 in. on radii edges. The installation is a three-stand tandem mill with separate DC variable-speed drives. One operator controls the entire line. (The Fenn Mfg. Co.)

For more data circle No. 41 on postcard, p. 165

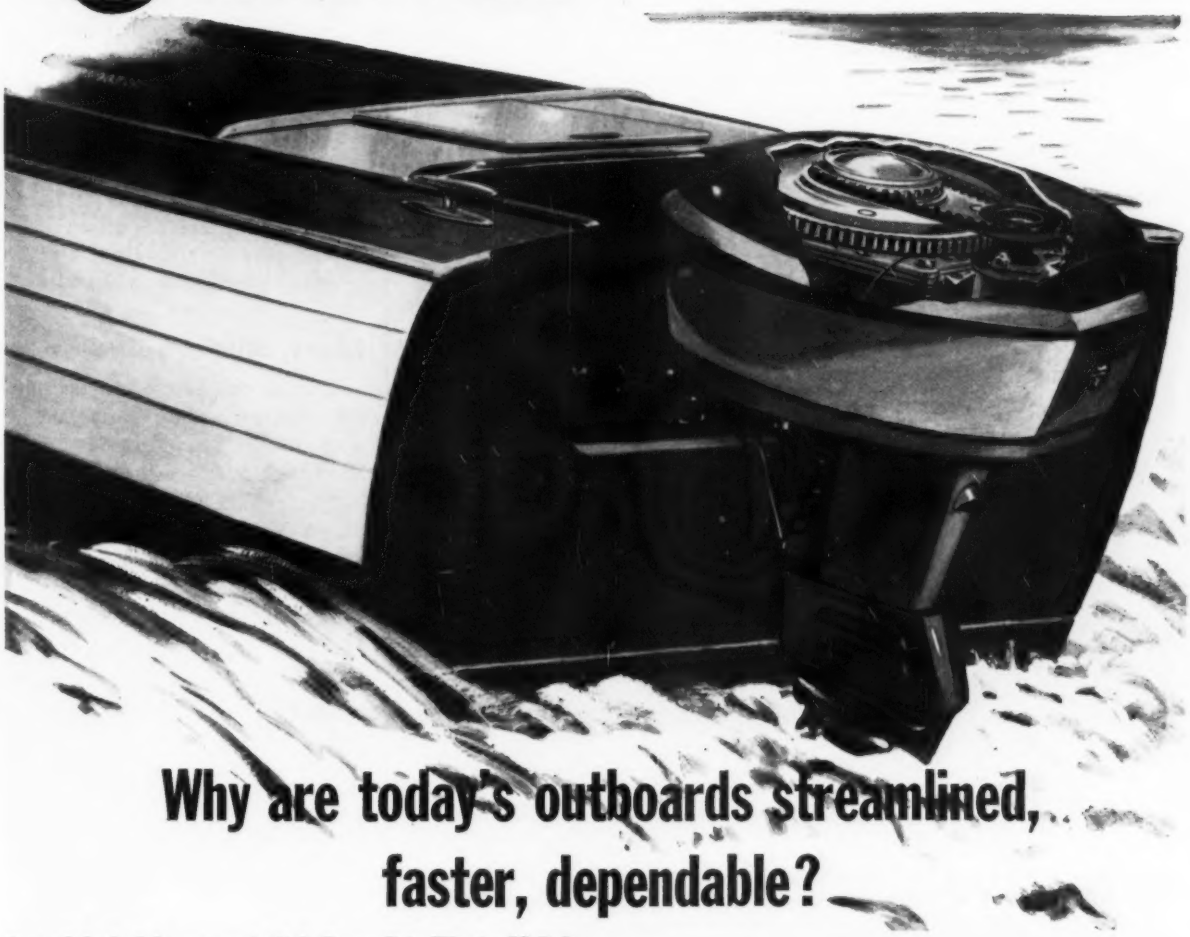


Draw Machine Has Squeeze Capacity of 21,000 lb

Super squeeze power for better compaction of green sand, resulting in better molds, faster production, and lower cost, is the outstanding feature of this jolt-squeeze-rollover draw machine. Its jolt capacity of 1500 lb and squeeze capacity of 21,000 lb on standard 80-psi line pressure constitute the largest machine of this type in the industry. It has a 12-in. pattern draw and 12½-in. squeeze stroke. A power rollover cylinder provides smooth rollover action. An "inverted jolt" cylinder mechanism with valve control allows jolt blows of any force. Air control valves for all operations are included. (SPO, Inc.)

For more data circle No. 42 on postcard, p. 165

US RUBBER **PowerGrip T Belt**



Why are today's outboards streamlined, faster, dependable?

A good deal of the reason is U. S. PowerGrip "Timing"® Belts, invented and perfected by "U. S." Engineers, now in use on the majority of the new outboard motors. PowerGrip gives a positive, non-slip drive. It assures constant electrical output without chance of slip-up—generator performs perfectly always.

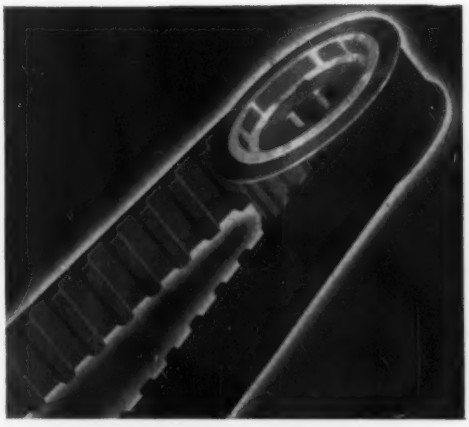
Other advantages that make PowerGrip indispensable:

- Trouble-free—no lubrication, noiseless, corrosion-resistant.
- Compact—short center-to-center distance, light weight.
- Safer—no slip to wear out belt, or cause breakdowns.

The U. S. PowerGrip "Timing" Belt drive may well improve your product, just as it has improved outboard motors. These drives are available in stock for every industry from U. S. PowerGrip "Timing" Belt Distributors, from fractional to 1000 hp.

• • •

When you think of rubber, think of your "U. S." Distributor. He's your best on-the-spot source of technical aid, quick delivery and quality industrial rubber products.



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US RUBBER

Mechanical Goods Division

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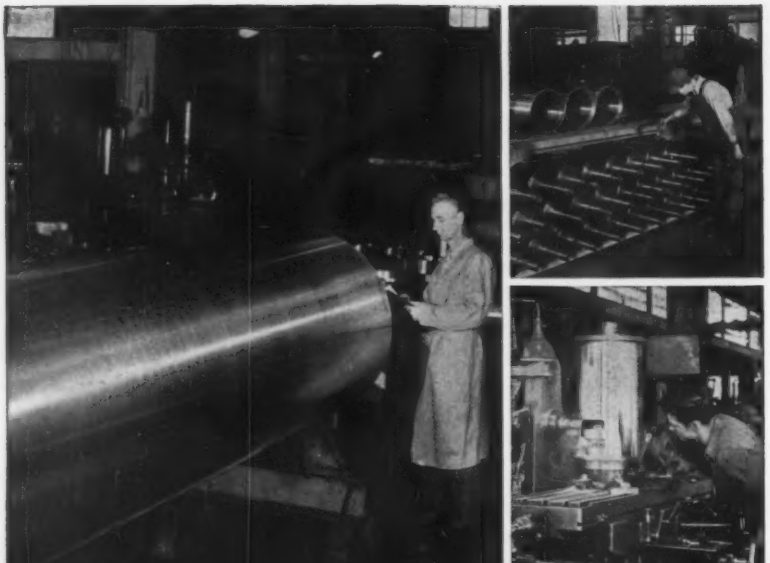
Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Company, Ltd.



You'll find them better for pressure if they're

SHENANGO CENTRIFUGAL CASTINGS

WHATEVER the inside or outside pressures, Shenango centrifugal castings are better able to withstand them without failure.

Parts cast by the Shenango centrifugal process are much tougher because their finer, *pressure-dense* grain avoids stress concentrations while providing greater strength, better elongation and freedom from such costly defects as sand inclusions, blowholes and such.

Whether you need rings, rolls, sleeves, liners, bushings, bearings, mandrels or *any* annular or symmetrical part . . . ferrous or non-ferrous . . . in whatever shape, size or dimension to meet your requirements . . . Shenango can do the job. And do the job *better!*

For informative bulletins on the answers to your tough problems, it will pay you to write now to: *Centrifugally Cast Products Division,* The Shenango Furnace Company, Dover, O.

SHENANGO CENTRIFUGAL CASTINGS

COPPER, TIN, LEAD, ZINC BRONZES • ALUMINUM AND MANGANESE BRONZES
MONEL METAL • NI-RESIST • MEEHANITE METAL • ALLOY IRONS

NEW EQUIPMENT

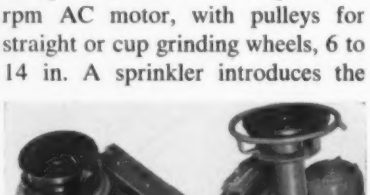
Indicator Holder

A powerful new magnetic-base indicator holder whose magnet can be turned on and off by pushing a control button is available. The unit is supplied with the necessary attachments to accommodate all types of dial and test indicators. A "step" across the top enables attaching to rounds. (Cullen Mfg. Co.)

For more data circle No. 43 on postcard, p. 165

Electrolytic Spindles

Two models of electrolytic spindle attachments for fast, "cool," micro-finish machining of hard Space-Age metals with low-voltage, high-amperage DC current are shown. The left one takes 600-amp DC power, and has a 5-hp, 1800-rpm AC motor, with pulleys for straight or cup grinding wheels, 6 to 14 in. A sprinkler introduces the



electrolyte. The right one is a direct-driven AC motorized unit, 7½-hp, with four speeds from 600 to 3600 rpm. It takes 3000-amp power. Cup wheels are 6 to 18 in., and straight wheels, 14 to 20 in. A 360° swivel base is provided. (Standard Electrical Tool Co.)

For more data circle No. 44 on postcard, p. 165

Automatic Tube-Cutter

A new automatic machine cuts off small diameter, round tubing at up to 12,000 pieces per hour. It cuts within ±0.005 in. of piece length for lengths up to 2 in. It cuts aluminum, copper, brass, or other copper-alloy tubing up to 7/16-in. OD, and can handle tubing of certain plastics. Dual feed allows the high cutoff rate. An operator can set up in 15 minutes, can tend two or

★★★★★ ★★★★★

IN EVERY FIELD, THERE IS ONE FOREMOST NAME . . . IN SONIC ENERGY, THAT NAME IS BENDIX

FACTS YOU MAY NOT KNOW ABOUT SONIC ENERGY CLEANING—

You probably know that Bendix Sonic Energy Cleaning is in truth a *production tool*—a practical method for (1) lowering cleaning costs while (2) improving product performance and (3) reducing the number of rejects. But perhaps you don't know the where-why-who needed to justify investment in equipment.

WHERE applicable (it isn't always), Bendix Sonic Energy Cleaning has set some new records for efficiency and economy (we'll show you case histories to back this up).

WHY Bendix® is today's top authority on this system can be answered in one word—*experience*. Bendix has lead since the early days, pioneering Sonic Energy Cleaning.

WHO can use it? Who cannot? That's easy to determine—Bendix maintains an Applications Laboratory where production experience is teamed with the latest facilities in finding the answer.

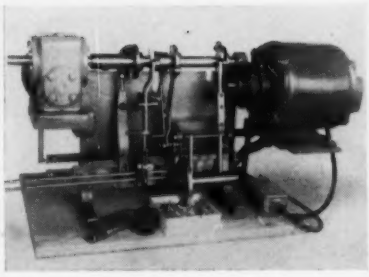
If you can use it to real advantage, Bendix has a complete line so that the best equipment for your particular needs can be selected quickly.

GET THE AUTHORITATIVE FACTS . . . SEND FOR THIS FREE REPORT

The principles and workings of Sonic Energy Cleaning are illustrated, described and analyzed in detail. A five-step plan is outlined to help you determine feasibility of Sonic Energy Cleaning for you. To get your copy, write PIONEER-CENTRAL DIVISION, BENDIX AVIATION CORPORATION, 2721 HICKORY GROVE ROAD, DAVENPORT, IOWA.

Bendix AVIATION CORPORATION

SONIC ENERGY CLEANING



three machines, and needs only to start in fresh lengths of tubing to keep them running. Special models are available for short and long cut-off lengths, for irregular tubing, and for round tubing up to ⅞-in. OD. (H & H Machine Co.)

For more data circle No. 45 on postcard, p. 165

Abrasive Machine

This unique tool cuts or abrades hard or brittle materials without shock or heat damage, by means of a precisely controlled stream of gas-propelled abrasive. The abrasive particles produce a cool, shockless cutting action, and material removal rate is so accurate that one manufacturer uses the unit to test-measure thicknesses of organic and anodized coatings. It has found new uses such as cutting and shaping fragile semiconductor crystals, and deburring tiny parts. (S. S. White Industrial Div.)

For more data circle No. 46 on postcard, p. 165

Valve-Plug Machine

Combination centering and spot-facing of various sizes of valve plugs is done by a new machine. The operator loads valve plugs into a fixture, locating the piece centrally over a mandrel and endwise from a locator. These are the only fixture parts requiring change in setup for new sizes. The machine handles plugs from 6 to 26 in. long and

FOR SMALL PARTS ON STEEL·COPPER·STAINLESS

for resistance to
- acids and alkalis
- corrosion
- moisture
- abrasion
- heat and cold
- oils and solvents

for
- permanence
- cleanliness
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- beauty

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Automatic, precision equipment permits you to take full advantage of porcelain enamel finishes at prices well in line with competitive, less suitable materials. Intricate silk screened designs a specialty.

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STAINLESS STEEL STRIP

THROUGH SUPERB FACILITIES . . . SUPERB QUALITY and DEPENDABLE DELIVERY

What do Wallingford Steel's new facilities—a new metallurgical laboratory, Sendzimir Mill installations, and automation gaging systems—mean to you, the user?

They mean *better* flexibility in the scheduling and delivery of strip to help you schedule *your* production more efficiently.

They mean *better* stainless steel and super metals with uniform quality and gage, lustrous finish, and exceptional resistance to high heat, corrosion and wear. Our exceptionally rigid quality control—X-ray gaging for strip thickness, sensitive elongation gaging for rolling operations—and laboratory sampling of our strip before shipping, assure you stainless strip which is unsurpassed.

In summary, *the stainless steel strip you need when you need it!*

FACILITIES FOR WIDTHS UP TO 27"—THICKNESSES DOWN TO .001"—EXTREMELY CLOSE TOLERANCES MAINTAINED

Write for complete data.

THE WALLINGFORD STEEL CO.

Progress in Metals for over 37 Years

WALLINGFORD, CONN., U.S.A.

COLD ROLLED STRIP: *Super Metals, Stainless, Alloy*
WELDED TUBES AND PIPE: *Super Metals, Stainless, Alloy*

NEW EQUIPMENT

2 to 6 in. diam. (Rehnberg-Jacobson Mfg. Co.)

For more data Circle No. 47 on postcard, p. 165

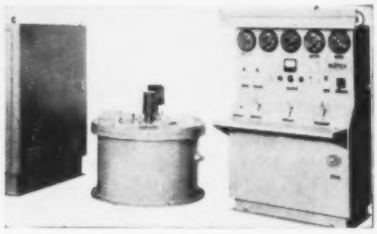
High-Heat Furnace

A box-type, high-temperature furnace has heat ranges to 3190°F. Automatic controllers are included. (Lucifer Furnaces, Inc.)

For more data circle No. 48 on postcard, p. 165

Spin-Test Units

Two new models of spin-test unit are available. One proof-tests single- or multi-stage rotors of jets, turbines, and other high-speed rotating equipment to 150,000 rpm.

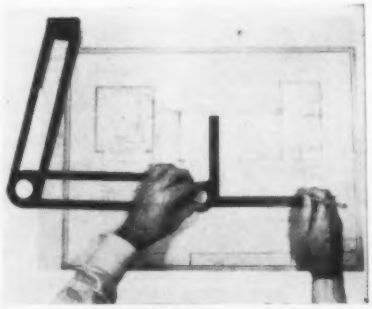


The other cycles high-speed test pieces between preset speed levels in order to study stress distribution under cyclic conditions. (Artisan Metal Products, Inc.)

For more data circle No. 49 on postcard, p. 165

Drafting Machine

A portable drafting machine eliminates work area clutter while covering 400 sq in. of drafting surface. It features a one-piece interchangeable scale divided into 16ths



or 10/50ths, with a 360° protractor. Weighing only 3½ lb, it jackknifes easily into a briefcase. (David Miller & Associates.)

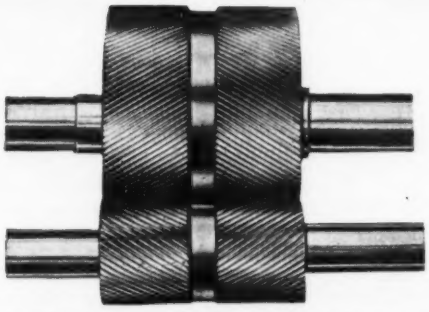
For more data circle No. 50 on postcard, p. 165

THE BEST MACHINES... MAKE THE BEST GEARS

It is axiomatic that "no gear can be any more accurate than the machine on which it is made" . . . to this end we have continually installed the most modern and accurate gear machinery for producing all types and sizes of gearing . . . these machines are operated by skilled gear craftsmen . . . but even this is not enough at Phillie Gear, for all gears must be checked and analyzed on the latest testing machines. *There's no compromising with Quality at Phillie Gear.*

Indicative of the standard of precision required of our manufacturing equipment is the gear hobber shown above. This machine has a special high accuracy table drive which is maintained accurate within 20 arc seconds. This accuracy is significant in consideration of the fact there are 1,290,000 arc seconds in a circle.

When you think of gears—think of Phillie Gear. Write for a free copy of our 76 Page Gear Book—a complete data book on all types of gears.



A set of large opposed Helical Gears and Pinions made for a high speed, single reduction drive . . . gears are carefully finished shaved for quiet operation. Philadelphia now has ultra precision facilities for tooth grinding up to 72" in diameter.

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Machine bases, components, environmental and test equipment, pressure vessels . . . welded fabrications of every kind. Extensive cutting, forming, welding. X-ray and gamma ray equipment. Qualified welders. All recognized codes. Send your drawings and specifications to us for prompt detailed quotations.

DESIGN SHOW

Design Engineers Meet in Philadelphia

▪ Members and guests of the American Society of Mechanical Engineers will convene in Philadelphia in two weeks for the fourth annual Design Engineering Conference and concurrent Design Engineering Show. Both will be held in Convention Hall, May 25 to 28, inclusive, with conference sessions in the morning and the show in the afternoon.

The conference and show are sponsored by the mechanical design division of the American Society of Mechanical Engineers.

The program follows:

1959 DESIGN ENGINEERING CONFERENCE

Sessions

Mon., May 25—10.00 a.m.

ENGINEERING DESIGN OVERSEAS

Co-Chairmen: Frank W. Barker, Research Corp.; Carl W. Besserer, Space Technology Laboratories.

Engineering Design in Germany, by Hellmuth Walter, Worthington Corp.

Tues., May 26—9:30 a.m.

MATERIALS

Co-Chairmen: John C. Redmond, Pittsburgh, Pa.; Robert N. Peterson, E. I. du Pont de Nemours & Co., Inc.

Latest Developments in Plastics for High Temperature Service, by Irving J. Gruntfest, General Electric Co.

Latest Developments in Metals and Ceramics for High Temperature Service, by Julius J. Harwood, Office of Naval Research.

POWER AND CONTROL

Co-Chairmen: Donald G. Dutcher, Hanson-VanWinkle-Munning Co.; R. W. Barnitz, Jones & Laughlin Steel Corp.

Variable Speed DC Drive Systems, by M. H. Sluis, Pratt & Whitney Co., Inc.

DC Conversion Devices, by J. J. Rheinhold, Richardson-Allen Corp.

MECHANICAL

Co-Chairmen: Francis L. Jackson, Franklin Institute Laboratories for Research and Development; T. R. Rideout, Port Chester, N. Y.

Design and Application of Belts, Chains and Gears, by E. S. Cheaney, W. C. Raridan and C. L. Paullus, Battelle Memorial Institute.

Clutch - Fluid Coupling - Torque Converter, Application Considerations and Performance Comparisons, by Robert W. Bachmann, Twin Disc Clutch Co.

Wed., May 27—9:30 a.m.

MATERIALS

Co-Chairmen: E. H. Phelps, U. S. Steel Corp.; R. V. Vanden Berg, Aluminum Co. of America.

Latest Developments in Materials to Resist Chemical Corrosion, by S. W. Shepard, Chemical Construction Corp.

Latest Developments in Materials and Coatings to Resist Atmospheric Corrosion, by E. Burt Friedl, Louis J. Nowacki, William H. Safranek,

AUCTION

COKE, GAS and CHEMICAL EQUIPMENT

of

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Of The Public Service Electric & Gas Co.

Front & Chestnut Sts., Camden, N.J.

TO BE SOLD ON THE PREMISES—TO THE HIGHEST BIDDERS

TUESDAY, JUNE 23, 1959 AT 11 A.M. DST

The Public Service Electric & Gas Co. is ceasing the manufacture of coal gas at their Camden Coke Plant. All equipment used in this process is being liquidated. Certain coke processing and handling equipment is being retained until the disposal of the present stock of coke is completed.

American Pulverizer Ring Mill Crusher, type 38-S, 150/300 tons-per-hr. capacity. Penn Hammermill, size SXT-12, 125-tons-per-hr. Koppers Oven Charging Larry Cars, 10 ton capacity. Koppers Hydraulic Door Machines. Latimer Coal Spillage Bucket Elevator, 50 tons per hr., crushed coal Koppers Coke Oven Pusher 1947. 34′ C to C gauge, Atlas electric Coke Quenching Locomotive, standard gauge. Tippett & Wood Steel Sludge Settling Tanks, 42′ height. Steel Water Scrubbers 12′ diameter x 70′ height. Koppers steel inclined Drum Rotary Kiln, 4′ diameter x 30′ length. "Fluor Counter Flo" Cooling Tower 1954, Redwood with stainless steel fasteners. Koppers Elex Precipitator 8′5″ x 26′2″ height. Otis Elevator 118′6″ high travel, car size 2′10″ x 4′ x 7′4″ height. Complete Natural Gas-Air Jet Plant, 8 Schutte-Koerting Jets with rated capacity with 40-lb. gas; to produce 400 M-CFH, of 575 BTU gas. Five United Engineering Primary Coolers, 7′ diameter x 30′6″ height, Tar Decanter Separator 20′ x 46′ x 10′6″ deep, I-R Gas Compressors, duplex and compound types, I-R Turbo Exhausters 11,000–17,000 CFM capacity. Other Processing Equipment includes 2 Builders Coal Providence Proportioning and Weighing Equipment. Latimer Steel Bucket Elevator 15.2 tons-per-hr. Howe Larry Scale type 10-60. Koppers Hydraulic Door Machines, Koppers Steel Quenching Cars, Koppers and Barnes Coke Oven Gas-Air Reversing Mechanism. Hydraulic Door Jack. 2 Cottrell Gas Precipitators, Packaged Units designed to handle approx. 2 million cubic ft. coke oven gas per day. Patterson Hot Water Storage Heater, 500 gal. I-R, Elliott, and Alberger Barometric Condensers, 5,000/40,000 lbs. steam per hr. Sharples Sulphate Dehydrator Dryer Type C-20, 6 Andale After coolers, style 22 x A-12. Koppers Centrifugal Driers, 40″ basket. Hungerford & Terry Sand Filter, Research Engineering Mechanical Rectifiers, Koppers Ammonia Condenser, and Ammonia Still. Struther-Wells Heat Exchanger. United Filter Press, Sager Mud Mill, Lifting Magnets, and asstd. Rubber belt, steel Roller Conveyor Units, 13′11″ to 310′ long, 24″ to 42″ wide. Miscellaneous Plant Equipment includes: Terry 200 k. w. Steam Turbine, I-R single stage Air Compressors. Centrifugal, Reciprocating, Oil and Water Pumps, asstd. sizes. Large Steel Tanks, Recording Instruments, Generators, 956 New Cooler Tubes, 2″ diameter, 24′ long, #10 B-W gauge, C. I. Gas Valves 50 lb. and Machine Spare Parts. Rahn Larmon Gap Lathe, 24/48″ Swing x 6′ Gap, 16′ long. Landis heavy duty Pipe Threader 12″ capacity. Nat'l Bolt Threader, Cleveland Openside Planer 30″ x 8′ table, Nazel hydraulic Hammer size 4-D, Radial Drill, Toledo Hacksaw, Blount Grinder, Portable Electric Welders, small Bandsaw, Chain Falls, Pulley Blocks, Portable Electric Drills, Chipping and Scaling Hammers, Grease Gun Equipment, Space Unit Heaters, Fire Extinguishers, etc.

Exhibition: June 17, 18, 19 & 22 from 10 A.M. to 4 P.M. or by appointment

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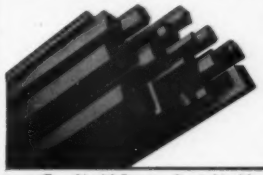

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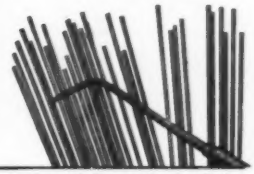

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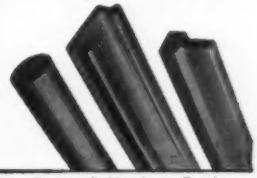

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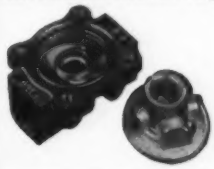

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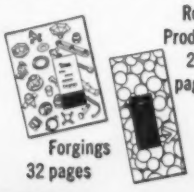

Rod Products 24 pages

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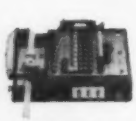
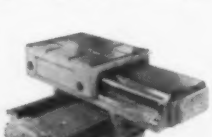


Tape Unit



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Logic Circuits for Machine Control, by Edgar V. Weir, Magnetics, Inc.

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Co-Chairmen: Dudley Fuller, Columbia University; Stanley Abramovitz, Continental Bearing Research Corp.

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Which Bearing and Why, by Arnold O. DeHart, General Motors Corp.

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A Graphic Method for Engineering Organization, by E. M. Ramberg, Titeflex, Inc.

The Man and the Organization, by Martin M. Bruce, Clark, Channell, Inc.

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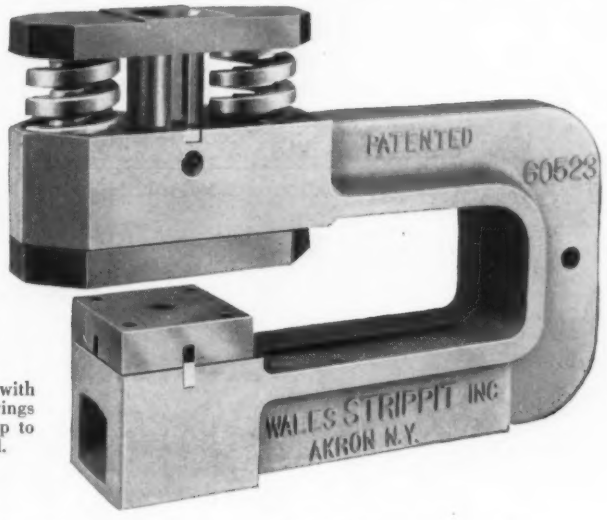

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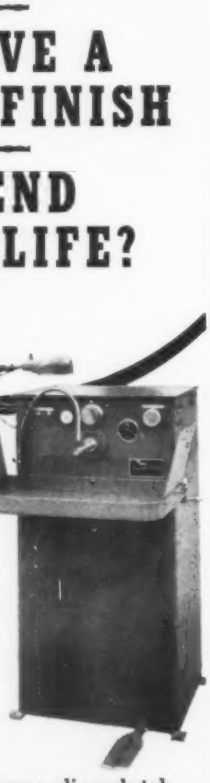

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Veeder-Root Inc.	1529
Vibro-Plus Products, Inc.	1345
Vickers, Inc.	1428, 1432
Viking Pump Co.	1610
Vlier Engineering Corp.	1044
Wagner Electric Corp.	1142
Waldes-Kohinoor, Inc.	413
John Waldron Corp.	1023
Wall Colmonoy Corp., Stainless Processing Div.	1050
Warner Electric Brake & Clutch Co.	314
The Weatherhead Co.	1301
Web Controls Corp.	467
Weckesser Co.	1633
Westline Products Div., of Western Lithograph Co.	1623
Westplex Corp.	705
The S. S. White Dental Mfg. Co.	1442
Whitney Chain Co.	1509
Edwin L. Wiegand Co.	1209
Winsmith, Inc.	1258
Wittek Mfg. Co.	1500
T. B. Wood's Sons Co.	1117
The Zero-Max Co., A Subsidiary of Revco Inc.	700

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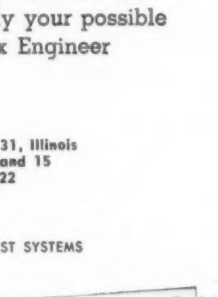

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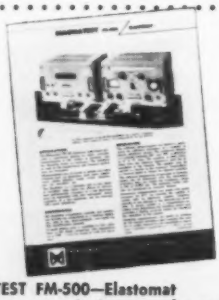

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The Iron Age Summary

Mill Slowdowns Worry Buyers

Some mills are not getting the production they had hoped for. They blame worker slowdowns, but see no organized effort.

In an already tight supply situation, steel users are discouraged.

▪ Steel users have a new worry this week: The fear of a possible rash of production slowdowns in the mills.

Some Midwestern mills report they have not been able to raise their production level as much as expected. They can't point to an organized effort by workers to cut output. But they are concerned about the signs of possible unrest, however nebulous.

The Danger—Whether the slowdowns will grow to serious proportions is problematical. It's doubtful that international steel labor leaders would encourage such tactics as long as the current contract remains in force. But local union leaders and plant "hotheads" can stir up trouble during tense contract negotiations.

For many steel users the supply outlook is already too tight for comfort. They are racing against time in their battle to build inventories as a hedge against a possible strike on June 30. And for some, it's a losing battle.

Conversion Deals—The tipoff on how tight the market is is the growing number of metalworking companies who are trying to make "conversion" deals. Under this arrangement, ingots or semi-finished steel are bought from one mill and shipped to another for rolling into finished shapes. This runs up the cost for the buyer. The trouble is that few mills have excess steel under present market conditions. So not too many deals have materialized.

One mill is furnishing 10,000 tons of ingots to another mill which will roll them into cold-rolled sheet for an auto company. The arrangement will probably cost the auto builder $20 to $30 per ton over and above the normal market price.

Delivery Delays—A big question mark for steel users is whether they will get the steel they ordered for June delivery. Most mills seem to be running behind in their delivery promises. The delivery situation is especially bad in sheets, strip, and galvanized sheets.

To offset this uncertainty, more companies are turning to warehouses and foreign sources for supplemental supplies. A Midwestern company reports it is buying service center steel in record tonnages. It normally buys direct from mills.

Service Centers Hit — But the warehouses have their own problems. In many cases they have had to put their regular customers on allocation. And they're having as much trouble as manufacturing plants in getting delivery from the mills. Service center stocks of plate and sheet are being hit hardest, but hot-rolled bar and cold-finished bar also are in strong demand.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,675	2,604	2,661	1,412
Ingot Index				
(1947-1949=100)	166.6	162.1	165.7	87.9
Operating Rates				
Chicago	93.0	93.0*	95.0	57.0
Pittsburgh	97.0	92.0*	95.5	53.5
Philadelphia	94.0	95.0	95.0	56.0
Valley	88.0	84.0*	89.0	38.5
West	93.0	93.0	92.5	72.0
Cleveland	99.0	95.0	96.0	26.0
Detroit	97.0	99.0*	99.0	37.0
Buffalo	107.0	105.0	105.0	39.0
South Ohio River	95.0	96.0*	94.0	53.0
South	93.0	91.5	95.0	67.0
Upper Ohio River	95.0	90.0*	90.0	76.0
St. Louis	99.5	96.0*	97.0	77.0
Aggregate	94.5	92.0	94.0	52.3

*Revised

Prices At a Glance

(Cents per lb unless otherwise noted)	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	5.967
Pig Iron (gross ton)	$66.41	$66.41	$66.41	$66.49
Scrap No. 1 hvy (Gross ton)	$33.83	$33.83	$35.17	$32.67
No. 2 bundles	$22.83	$22.83	$23.17	$23.83
Nonferrous				
Aluminum ingot	26.80	26.80	26.80	26.10
Copper, electrolytic	31.50	31.50	31.50	25.00
Lead, St. Louis	11.80	11.30	10.80	11.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	102.75	102.625	102.25	94.75
Zinc, E. St. Louis	11.00	11.00	11.00	10.00

Integrate Handling to Cut Costs

There's more to efficient materials handling than just setting up systems for various plant areas.

Best results come from an integrated flow of goods from receiving dock to shipping platform.

▪ Materials handling systems have reached the final area where substantial savings can be realized: The efficient, integrated flow of goods from receiving dock to shipping platform.

Until the last few years effective handling systems speeded various distribution and production operations. But often the setups were not co-ordinated, lacked any worthwhile connection.

There was little lasting benefit in modern materials handling systems which only piled up work between departments, or resulted in log-jams at the shipping dock.

Attention to Flow—As a result a new area for savings in materials handling opened up. Now more and more conveyor layouts—and other handling systems—are designed for the continuous flow of goods. Often this movement will be handled automatically. There's an increasing trend to fully automated systems with controls centralized in one area.

Greater Control — A conveyor manufacturer commenting on this trend says, "Completely automated systems are becoming more common. And this will focus more importance on control systems and refinements."

Another says: "When you look at the processes and production rates today, you don't have to be a master mind to see that such applications are increasing in number by great leaps and bounds."

Necessarily much of the new highly automatic equipment is specialized but a conveyor maker adds, "Automation and new developments in materials handling methods will undoubtedly result in new components which will have standardized use in future systems."

Sales Move Up—Right now, the conveyor industry is moving well ahead of last year's sales levels. Orders received during the early months of 1959 were about 20 pct above those of early 1958. New bookings are exceeding shipments by about 15 pct.

Delivery Promises—These delivery estimates are given by one conveyor manufacturer: Roller gravity conveyors — stock; custom-built roller conveyors—2-3 weeks; belt conveyors (standard)—10 days to 2 weeks; and custom-built belt conveyors—6 weeks. Another lists standard product deliveries at "stock to 4 weeks." A third reports conveyor components as stock with complete systems taking 3-9 months working time.

Price Hikes Possible—On the question of prices during 1959 there's little optimism conveyor prices will remain at present levels. A few manufacturers believe increases are unlikely.

Generally, however, the upward trend is expected to continue.

ON THE MOVE: Handling systems should be designed to keep raw materials and finished goods flowing smoothly and quickly between operations, conveyor manufacturers say. (Baltimore and Ohio Railroad photo.)

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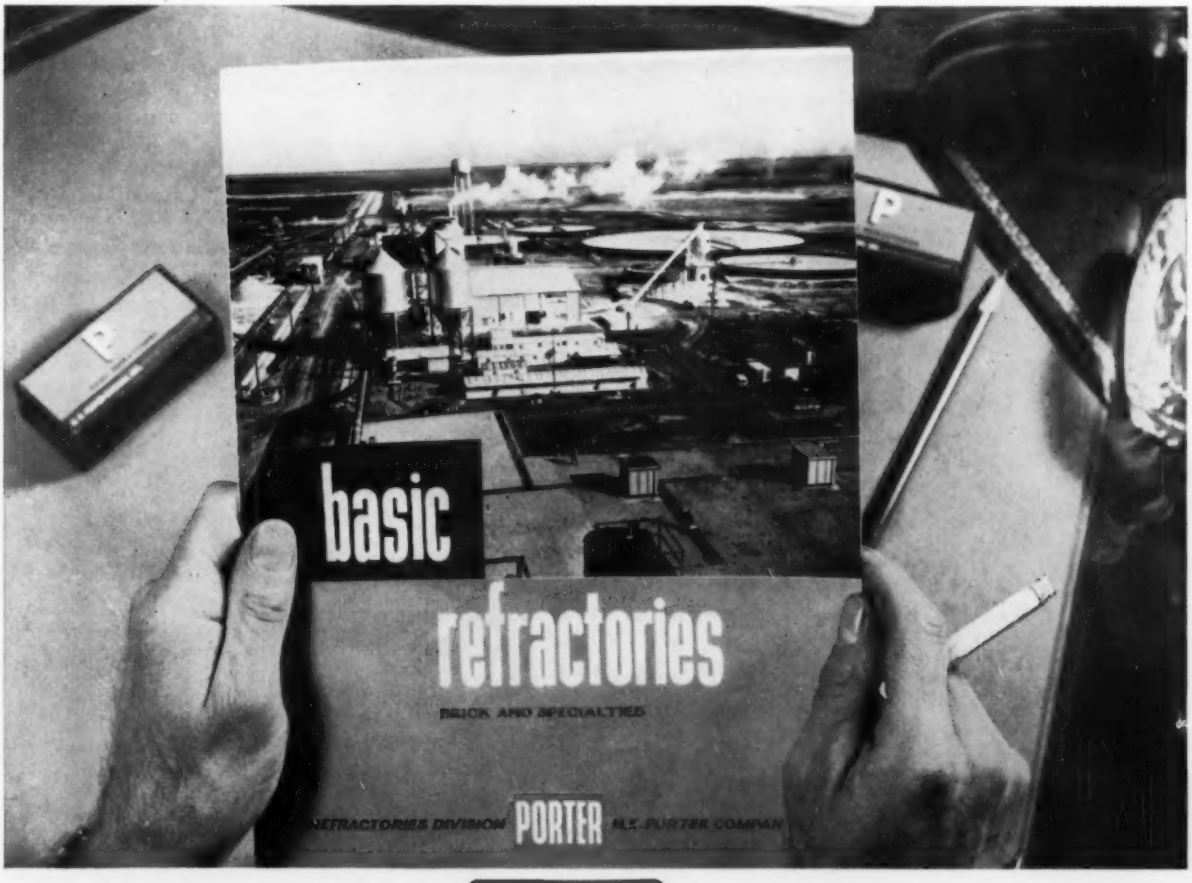

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How Firm Are Third Quarter Orders?

There's mill concern that some orders placed beyond June may not be firm.

But it appears buyers will be glad to take the steel—when it's available.

▪ Mills continue accepting third quarter orders—sometimes in heavy volume.

But as the tonnage is entered there's concern about the firmness of the orders. Some buyers, it's reasoned, may just be trying to protect themselves in the event of a steel strike. They want to be first in line when production is resumed. Then, if they don't need the steel, the orders will be deferred or cancelled.

However, most of the ordering appears genuine. Buyers, for example, have placed July tonnages where delivery is fairly certain. These are with mills whose union contracts run until August 1. Or with mills which are non-union and presumably won't be struck.

One sheet mill with a contract running through July has already booked over 80 pct of its cold-rolled tonnage for the month. Other mills are placing third quarter orders on a quota system, holding customers to the tonnage they usually order.

Some buyers are apparently taking third quarter bookings only because they can't get anything earlier. Structural mills in the Midwest say some users realized the market was tightening too late. With mills now on six-week carryovers, these customers are already booking shapes well into August.

The carryover problem complicates the whole third quarter delivery outlook. Mill carryovers now vary from a week along the East Coast to six weeks or more in the Chicago area. Even if there's no strike the Midwest mills will still be rolling June tonnages during August.

Warehouse Pricing — Pittsburgh area service centers are adopting a new system of pricing which ties their costs closer to actual selling prices. (See story p. 113.) Under the revised lists of item extras and quantity discounts buyers may combine orders for savings. Here are the new schedules:

Order discounts per 100 lb:

20,000 lbs and over	**—deduct 75¢**
10,000 lb to 19,999	**—deduct 65¢**
5000 lb to 9999	**—deduct 55¢**
2000 lb to 4999	**—deduct 45¢**
1000 lb to 1999	**—deduct 35¢**
400 lb to 999	**—deduct 25¢**
Under 400 lb	**—Base price**

Item extras per 100 lb:

10,000 lb and over	**—Base price**
5000 lb to 9999	**—plus 10¢**
2000 lb to 4999	**—plus 35¢**
1000 lb to 1999	**—plus 85¢**
400 lb to 999	**—plus $2**
100 lb to 399	**—plus $6**
Under 100 lb	**—plus $9**

Sheet and Strip—Customers are pressuring mills about shipments as delivery delays mount. Carryovers range from a week or two along the **East Coast** to about six weeks in the **Chicago** area. In some cases mills and buyers are trying to decide which orders are most needed, which can be delayed a while.

Pittsburgh mills say second quarter demand will exceed their ability to ship. **Cleveland** area sheet users, where carryovers average two weeks or more, have little hope of getting June delivery.

Plates—Third quarter orders for plate have stepped up sharply in the last week. Mills predict July books will soon be filled out. An **Eastern** producer will accept inquiries on universal mill plate for June delivery, but sheared mill plate is sold out. With plate very tight in the **Chicago** area some users are relying on foreign-made steel.

Structurals—Eastern and Pittsburgh mills still have some space open for June on standard structurals. Wide flange beams are sold out through the first half. Third quarter bookings of shapes at **Chicago** are very heavy.

Pipe and Tubing—Producers are still waiting for that last minute rush of orders for standard pipe. Mills have built up stocks to be ready, but the jobbers show few signs of buying. Orders for oil country seamless have tapered off as expected. Mills believe pipe consumption has been higher than expected. So it's hoped the third quarter order drop will be less than anticipated.

Service Centers—Reports of the American Steel Warehouse Assn. place business in the first quarter of 1959 about 22 pct over the last quarter of 1958. Distributors predict second quarter sales will run about 10-15 pct over those of first quarter '59. If warehouses could get the steel to sell the sales would range even higher.

PURCHASING AGENT'S CHECKLIST

New system of warehouse pricing will aid buyers who skillfully combine purchases. P. 109

Ferrous foundries find sales climate healthy. P. 110

Don't be "penny wise and pound foolish" in using tool inserts, maker warns. P. 129

COMPARISON OF PRICES

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland Youngstown.

Price advances over previous week are printed in **Heavy Type**; declines appear in *Italics*.

	May 12 1959	May 5 1959	Apr 14 1959	May 13 1958
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	4.925¢
Cold-rolled sheets	6.275	6.275	6.275	6.05
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.60
Hot-rolled strip	5.10	5.10	5.10	4.925
Cold-rolled strip	7.425	7.425	7.425	7.17
Plate	5.30	5.30	5.30	5.12
Plates, wrought iron	13.55	13.55	13.55	13.15
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.30
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.00
Special coated mfg. ternes	9.90	9.90	9.90	9.55
Bars and Shapes: (per pound)				
Merchant bar	5.675¢	6.675¢	5.675¢	5.425¢
Cold finished bar	7.65	7.65	7.65	7.30
Alloy bars	6.725	6.725	6.725	6.475
Structural shapes	5.50	5.50	5.50	5.275
Stainless bars (No. 302)	46.75	46.75	45.00	45.00
Wrought iron bars	14.90	14.90	14.90	14.45
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	7.65¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.525
Light rails	6.725	6.725	6.725	6.50
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$77.50
Slabs, rerolling	80.00	80.00	80.00	77.50
Forging billets	99.50	99.50	99.50	96.00
Alloys blooms, billets, slabs	119.00	119.00	119.00	114.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.15¢
Skelp	5.05	5.05	5.05	4.875
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	5.967¢

(Effective May 12, 1959)

	May 12 1959	May 5 1959	Apr. 14 1959	May 13 1958
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.97
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.47
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	12.25	12.25	12.25	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.49
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	**$36.50**	$35.50	$38.50	$33.50
No. 1 steel, Phila. area	33.50	33.50	33.50	34.00
No. 1 steel, Chicago	*31.50*	32.50	33.50	30.50
No. 1 bundles, Detroit	**31.50**	29.50	32.50	24.50
Low phos., Youngstown	38.50	38.50	40.50	34.50
No. 1 mach'y cast, Pittsburgh	49.50	49.50	49.50	48.50
No. 1 mach'y cast, Phila.	49.50	49.50	49.50	47.50
No. 1 mach'y cast, Chicago	**53.50**	52.50	53.50	43.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$33.83	$33.83	$35.17	$32.67
No. 2 bundles	22.83	22.83	23.17	23.83
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.50-15.50	$14.50-15.50	$14.50-15.50	$15.38
Foundry coke, prompt	18.50	18.50	18.50	17.50-19
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	31.50	31.50	31.50	25.00
Copper, Lake, Conn.	31.50	31.50	31.50	25.00
Tin, Straits, N. Y.	**102.75**	102.625	102.25	94.75
Zinc, East St. Louis	11.00	11.00	11.00	10.00
Lead, St. Louis	**11.80**	11.30	10.80	11.80
Aluminum, virgin ingot	26.80	26.80	26.80	26.10
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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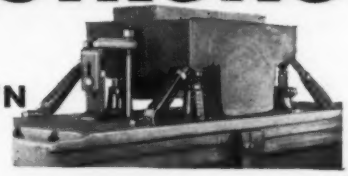

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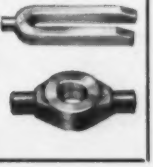

Domestic Market Is in Doldrums

Mills show little interest in buying even small tonnages of scrap.

Many dealers won't sell at current prices, anyway. Export adds a little zest in the port districts.

▪ The scrap market this week is dull but restless.

In Pittsburgh, a spark of mill interest in scrap sent the price of No. 1 heavy melting up $1, although no large amount of material changed hands.

In Chicago, the opposite happened. A mill came into the market for openhearth material at lower prices and got what it wanted.

Prices in Detroit rose an average of $2 on anticipated mill purchases. But in Birmingham, prices tumbled $2 on basis of upcoming orders.

Elsewhere, the domestic market is in the doldrums. Most dealers and brokers are resigned to a long period of inactivity in the domestic market.

Foreign orders are injecting some life into the port districts, however. Prospects are good for moderate export business into June.

With The IRON AGE No. 1 heavy melting Composite Price unchanged for the third straight week at $33.83, it appears that the market may have reached bottom.

Pittsburgh—The market strengthened this week as railroad lists went higher than expected and mills showed new interest in buying. Final railroad lists sent No. 1 railroad heavy melting up $2 and railroad specialties up $3. The price of No. 1 dealer heavy melting rose $1 as mill inquiries for scrap at current levels found no sellers. No. 2 bundles are moving slowly on old orders. It is not clear yet how hard consumers will push for scrap. But it is certain higher prices will be needed for tonnage movements.

Chicago—Price of No. 1 heavy melting and No. 1 busheling dropped $1 to $31-$32. A small tonnage was sold at $1 less than this, but the bulk of material went for $32. Market for openhearth scrap is still weak and further drops are possible. Machine shop turnings and cast grades, on the other hand, are up $1. Stainless 18-8 grades dropped $10.

Philadelphia—Export is keeping this market alive. Shiploadings are expected to continue at least into June. But domestic business is almost at a standstill. One district mill has taken a few carloads of openhearth material at quoted prices. Prices are unchanged.

New York—Turnings have become a distress item here in face of consumer disinterest. Machine shop turnings are down to $9-$10 and the trade feels the bottom has not yet been reached. A trickle of export business is propping up steelmaking grades.

Detroit — Prices of openhearth, blast furnace, and cast iron scrap are up $1 to $2. Dealer resistance is beginning to tell as lower prices dry up sources. Some see the expected purchase of scrap by a large local mill at higher - than - quoted prices as an attempt to prevent an early drought from hitting the market.

Cleveland — Small tonnages of special prime grades are moving locally and out of district, giving some strength to the market. But open orders are practically non-existent. Regular dealer grades are still in low demand. Collections of unprepared scrap are dropping off. Prices are unchanged except for No. 1 railroad heavy melting, down $1.50.

St. Louis—Quietness prevails in the scrap market here. Prices of most grades are unchanged. The exceptions: No. 2 dealer bundles, rails, random length, and stove plate are off $2. Shoveling turnings are down $1.

Birmingham — Prices of most openhearth, electric furnace, and blast furnace grades are down $1 to $2. Brokers cut their prices for heavy melting scrap in anticipation of lower consumer prices. A large electric furnace mill cut its prices. An Atlanta mill is expected buy this week at lower prices.

Cincinnati—Dealers are expected to hold on to their material as price resistance grows. Eastern river points are ordering good tonnage but brokers are having trouble covering them. Pittsburgh buyers are showing some interest in local material.

Buffalo—Prices of No. 1 and No. 2 heavy melting dropped $1 on a sale. Turnings items are off $1. A sale of cast iron was made at $2 less than former prices.

Boston — The market is practically dead. Neither domestic nor export shows signs of life.

West Coast — Market continues sluggish. Underlying weakness is evident due to price drops in the East and steel strike fears. There is a backlog in export orders but a lull in actual loadings. No. 1 dealer bundles are down $1 in San Francisco. Other prices are unchanged.

Houston—Prices are unchanged in a quiet market. An East Texas mill dropped its buying prices $2 to $3 on openhearth grades, but it is too distant to affect prices here.

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SCRAP PRICES *(Effective May 12, 1959)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	38.00 to 39.00
No. 1 factory bundles	42.00 to 43.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	37.00 to 38.00
Machine shop turn.	19.00 to 20.00
Shoveling turnings	26.00 to 27.00
Cast iron borings	25.00 to 26.00
Low phos. punch'gs plate	43.00 to 44.00
Heavy turnings	29.00 to 30.00
No. 1 RR hvy. melting	39.00 to 40.00
Scrap rails, random lgth.	49.00 to 50.00
Rails 2 ft and under	54.00 to 55.00
RR specialties	47.00 to 48.00
No. 1 machinery cast.	49.00 to 50.00
Cupola cast.	43.00 to 44.00
Heavy breakable cast.	41.00 to 42.00
Stainless	
18-8 bundles and solids	230.00 to 235.00
18-8 turnings	115.00 to 120.00
430 bundles and solids	130.00 to 135.00
410 turnings	55.00 to 60.00

Chicago

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	32.00 to 33.00
No. 1 factory bundles	37.00 to 38.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	31.00 to 32.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Low phos. forge crops	44.00 to 45.00
Low phos. punch'gs plate, ½ in. and heavier	41.00 to 42.00
Low phos. 2 ft and under	39.00 to 40.00
No. 1 RR hvy. melting	36.00 to 37.00
Scrap rails, random lgth.	42.00 to 43.00
Rerolling rails	54.00 to 55.00
Rails 2 ft and under	51.00 to 52.00
Angles and splice bars	46.00 to 47.00
RR steel car axles	62.00 to 63.00
RR couplers and knuckles	44.00 to 45.00
No. 1 machinery cast.	53.00 to 54.00
Cupola cast.	46.00 to 47.00
Cast iron wheels	38.00 to 39.00
Malleable	54.00 to 55.00
Stove plate	44.00 to 45.00
Steel car wheels	42.00 to 43.00
Stainless	
18-8 bundles and solids	210.00 to 215.00
18-8 turnings	110.00 to 115.00
430 bundles and solids	115.00 to 120.00
430 turnings	55.00 to 60.00

Philadelphia Area

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	17.00 to 19.00
Mixed bor. short turn.	17.00 to 19.00
Cast iron borings	17.00 to 19.00
Shoveling turnings	23.00 to 24.00
Clean cast. chem. borings	26.00 to 27.00
Low phos. 5 ft and under	37.00 to 40.00
Low phos. 2 ft punch'gs	39.00 to 42.00
Elec. furnace bundles	38.00 to 39.00
Heavy turnings	32.00 to 33.00
RR specialties	42.00 to 43.00
Rails 18 in. and under	58.00 to 60.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast.	42.00 to 43.00
Cast iron car wheels	44.00 to 45.00
Malleable	67.00 to 68.00
No. 1 machinery cast.	49.00 to 50.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$31.50 to $32.50
No. 2 hvy. melting	26.50 to 27.50
No. 1 dealer bundles	31.50 to 32.50
No. 2 bundles	20.00 to 21.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	16.00 to 17.00
Low phos. 18 in. and under	40.00 to 41.00
Rails, random length	46.00 to 47.00
Rails, 18 in. and under	53.00 to 54.00
No. 1 cupola cast.	43.00 to 44.00
Hvy. breakable cast.	40.00 to 41.00
Drop broken cast.	48.00 to 49.00

Youngstown

No. 1 hvy. melting	$36.50 to $37.50
No. 2 hvy. melting	30.50 to 31.50
No. 1 dealer bundles	36.50 to 37.50
No. 2 bundles	24.00 to 25.00
Machine shop turn.	18.50 to 19.50
Shoveling turnings	23.50 to 24.50
Low phos. plate	38.00 to 39.00

Cleveland

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	33.00 to 34.00
No. 1 factory bundles	38.00 to 39.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	33.00 to 34.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	20.00 to 21.00
Cut structural & plates, 2 ft & under	40.00 to 41.00
Drop forge flashings	33.00 to 34.00
Low phos. punch'gs plate	34.00 to 35.00
Foundry steel, 2 ft & under	35.00 to 36.00
No. 1 RR hvy. melting	36.50 to 37.50
Rails 2 ft and under	56.00 to 57.00
Rails 18 in. and under	57.00 to 58.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	53.00 to 54.00
No. 1 machinery cast.	51.00 to 52.00
Stove plate	48.00 to 49.00
Malleable	66.00 to 67.00
Stainless	
18-8 bundles	215.00 to 225.00
18-8 turnings	115.00 to 120.00
430 bundles	120.00 to 125.00

Buffalo

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 busheling	31.00 to 32.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	16.00 to 17.00
Low phos. plate	37.00 to 38.00
Structurals and plate, 2 ft and under	41.00 to 42.00
Scrap rails, random lgth.	39.00 to 40.00
Rails 2 ft and under	49.00 to 50.00
No. 1 machinery cast.	48.00 to 49.00
No. 1 cupola cast.	44.00 to 45.00

St. Louis

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	12.50 to 13.50
Shoveling turnings	14.00 to 15.00
Cast iron borings	18.00 to 19.00
No. 1 RR hvy. melting	37.00 to 38.00
Rails, random lengths	43.00 to 44.00
Rails, 18 in. and under	49.00 to 50.00
Angles and splice bars	44.00 to 45.00
RR specialties	42.00 to 43.00
Cupola cast.	48.00 to 49.00
Heavy breakable cast.	40.00 to 41.00
Cast iron brake shoes	38.00 to 39.00
Stove plate	43.00 to 44.00
Cast iron car wheels	40.00 to 41.00
Rerolling rails	54.00 to 55.00
Unstripped motor blocks	41.00 to 42.00

Birmingham

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	20.00 to 21.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	14.00 to 15.00
Electric furnace bundles	34.00 to 35.00
Elec. furnace, 3 ft & under	32.00 to 33.00
Bar crops and plate	38.00 to 39.00
Structural and plate, 2 ft.	37.00 to 38.00
No. 1 RR hvy. melting	33.00 to 34.00
Scrap rails, random lgth.	40.00 to 41.00
Rails, 18 in. and under	48.00 to 49.00
Angles and splice bars	42.00 to 43.00
Rerolling rails	52.00 to 53.00
No. 1 cupola cast.	53.00 to 54.00
Stove plate	53.00 to 54.00
Cast iron car wheels	39.00 to 40.00
Unstripped motor blocks	40.00 to 41.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	21.00 to 22.00
No. 2 dealer bundles	15.00 to 16.00
Machine shop turnings	9.00 to 10.00
Mixed bor. and turn.	11.00 to 12.00
Shoveling turnings	13.00 to 14.00
Clean chem. cast. borings	20.00 to 21.00
No. 1 machinery cast.	37.00 to 38.00
Mixed yard cast.	35.00 to 36.00
Heavy breakable cast.	33.00 to 34.00
Stainless	
18-8 prepared solids	195.00 to 200.00
18-8 turnings	85.00 to 90.00
430 prepared solids	85.00 to 90.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	20.00 to 21.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	17.00 to 18.00
No. 1 busheling	29.00 to 30.00
Drop forge flashings	28.00 to 29.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	12.00 to 13.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	12.00 to 13.00
Heavy breakable cast.	31.00 to 32.00
Mixed cupola cast.	41.00 to 42.00
Automotive cast.	47.00 to 48.00
Stainless	
18-8 bundles and solids	210.00 to 215.00
18-8 turnings	100.00 to 105.00
430 bundles and solids	100.00 to 105.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$24.00 to $25.00
No. 2 hvy. melting	20.00 to 21.00
No. 1 dealer bundles	24.00 to 25.00
No. 2 bundles	12.00 to 13.00
No. 1 busheling	24.00 to 25.00
Machine shop turn.	6.00 to 7.00
Shoveling turnings	11.00 to 12.00
Clean cast. chem. borings	16.00 to 17.00
No. 1 machinery cast.	33.00 to 34.00
Mixed cupola cast.	33.00 to 34.00
Heavy breakable cast.	31.00 to 32.00
Stove plate	29.00 to 30.00

San Francisco

No. 1 hvy. melting	$36.00
No. 2 hvy. melting	33.00
No. 1 dealer bundles	33.00
No. 2 bundles	22.00
Machine shop turn.	17.00
Cast iron borings	17.00
No. 1 cupola cast.	45.00

Los Angeles

No. 1 hvy. melting	$38.00
No. 2 hvy. melting	36.00
No. 1 dealer bundles	35.00
No. 2 bundles	18.00
Machine shop turn.	$16.00 to 17.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Elec. furn. 1 ft and under (foundry)	49.00
No. 1 cupola cast.	45.00

Seattle

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	22.00
No. 1 cupola cast.	36.00
Mixed yard cast.	36.00

Hamilton, Ont.

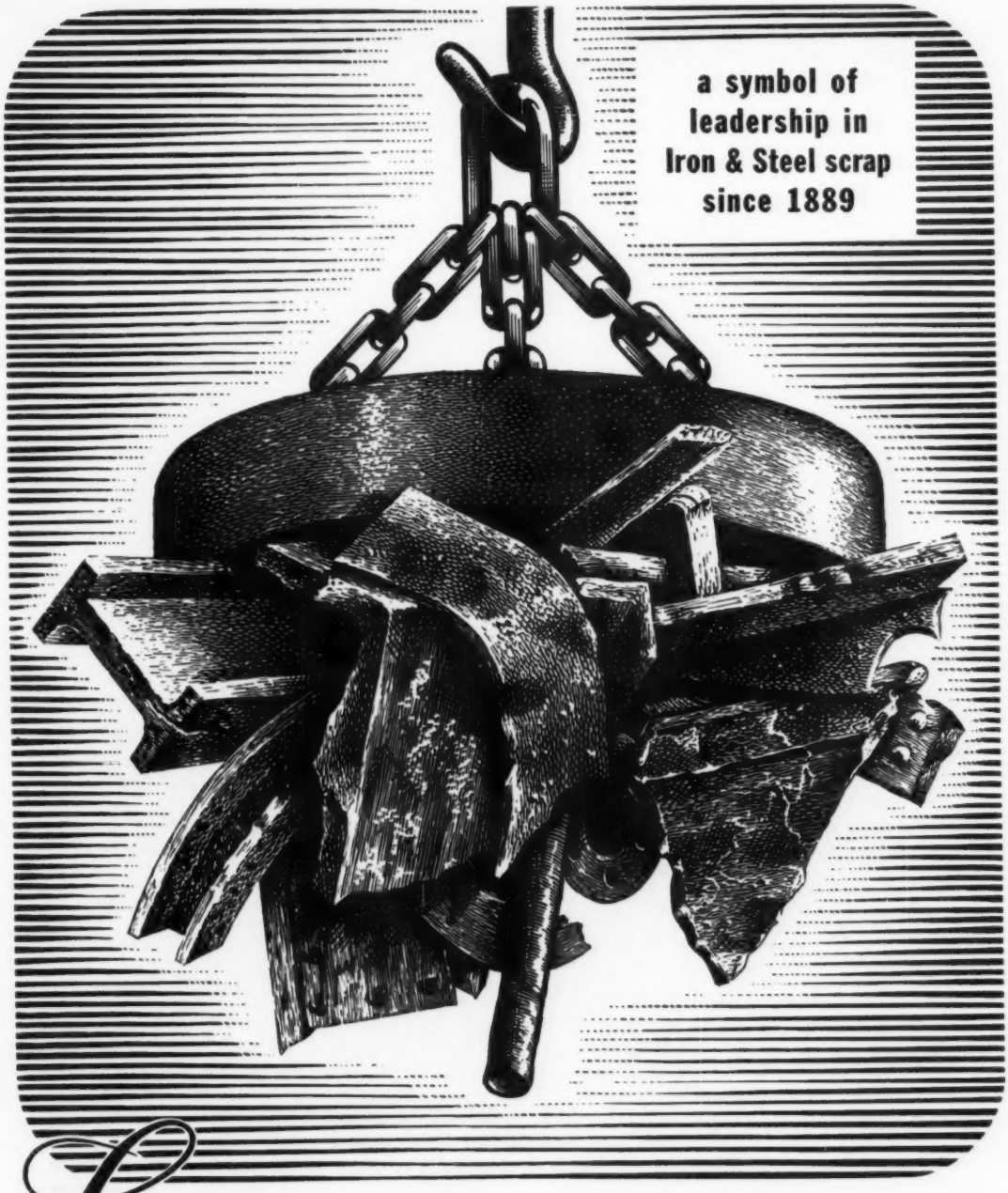
Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$32.25
No. 2 hvy. melting	28.25
No. 1 dealer bundles	32.25
No. 2 bundles	22.75
Mixed steel scrap	24.25
Bush., new fact., prep'd.	32.25
Bush., new fact., unprep'd	26.25
Machine shop turn.	14.00
Shortsteel turn.	17.00
Mixed bor. and turn.	13.00
Rails, rerolling	37.00
Cast scrap	$46.50 to 48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	31.00
No. 2 bundles	20.00
Machine shop turn.	16.00
Shoveling turnings	20.00
Cut structural plate 2 ft & under	$44.00 to 45.00
Unstripped motor blocks	37.00 to 38.00
Cupola cast.	44.00 to 45.00
Heavy breakable cast.	28.00 to 29.00



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U.S. Overstocked By $4 Billion

General Services Administration figures about half its metal and mineral holding is surplus.

The problem: It's too costly to keep, a hot potato to sell.

▪ If you know how to move a mountain of surplus metals and minerals without dumping them in the ocean or on touchy markets, get in touch with General Services Administration. Likely you'll get a hero's welcome.

GSA, the federal custodian, now figures it has some $4 billion in metals and minerals it no longer needs, either because of technological advances, or because of the switch to planning for a three-year instead of five-year war.

They'd like very much to get rid of this extra material because the maintenance bill is running about $15 million annually.

OK to Sell—Some of this has been taken in under the Defense Production Act. Legally, GSA can move this, and in fact has a list of 39 items, including copper, on which disposal has been approved.

But most of the metals and minerals owned by the government ($6.5 billion of the $8 billion total) are in the strategic or supplemental stockpile. To touch this takes an act of Congress.

Congress Balks — Some sharp mail from home has put Congress in a fairly economical mood. They'd love to save their constituents a fast $15 million plus. But anytime someone looks at DPA metal or any stock a solid and vocal bloc of mining states congressmen springs to arms.

Thus far, the Administration's plans are vague. Observers note this is a situation where someone is going to be unhappy. They say it is likely our several stockpiles will be consolidated into a single program.

In Time—What will happen to our current surplus? No one will say for the record. Best bet: They'll be disposed of carefully, over a decade at the very least.

Nickel

The question is, "Is the contract the government signed with Freeport Sulphur Co. for new nickel capacity less advantageous to the government than the proposals of International Nickel and Bethlehem Steel.

Rep. Jack Brooks (D., Tex.) chairman of the probing government activities subcommittee appears to be conducting his investigation as though he already knows the answer.

Government observers say this is another case where the government went a little too far under pressure of a shortage. They say although the terms would be tougher if the contract were negotiated today, a comparison with other offers made at the time will be very inconclusive, prove nothing.

Another indication that Rep. Brooks is building a case, not making an investigation: Freeport was not approached to testify, but went to the committee and requested to speak, says Freeport source.

Aluminum

There now appears to be hedging creeping into aluminum markets. Sellers admit, privately, that business turned upward more sharply in the last few weeks. Customer's operating rates are higher, but few believe they are high enough to justify the current upturn.

The producers have taken the extra demand without batting an eye.

The industry is meeting all demand, and still has about 13 pct of its capacity open.

Tin prices for the week: May 6—102.50; May 7—102.50; May 8—102.625; May 11—102.625; May 12—102.75.*

* Estimate.

Monthly Average Metal Prices

(Cents per lb except as noted)

Average prices of the major nonferrous metals in APRIL based on quotations appearing in THE IRON AGE, were as follows:

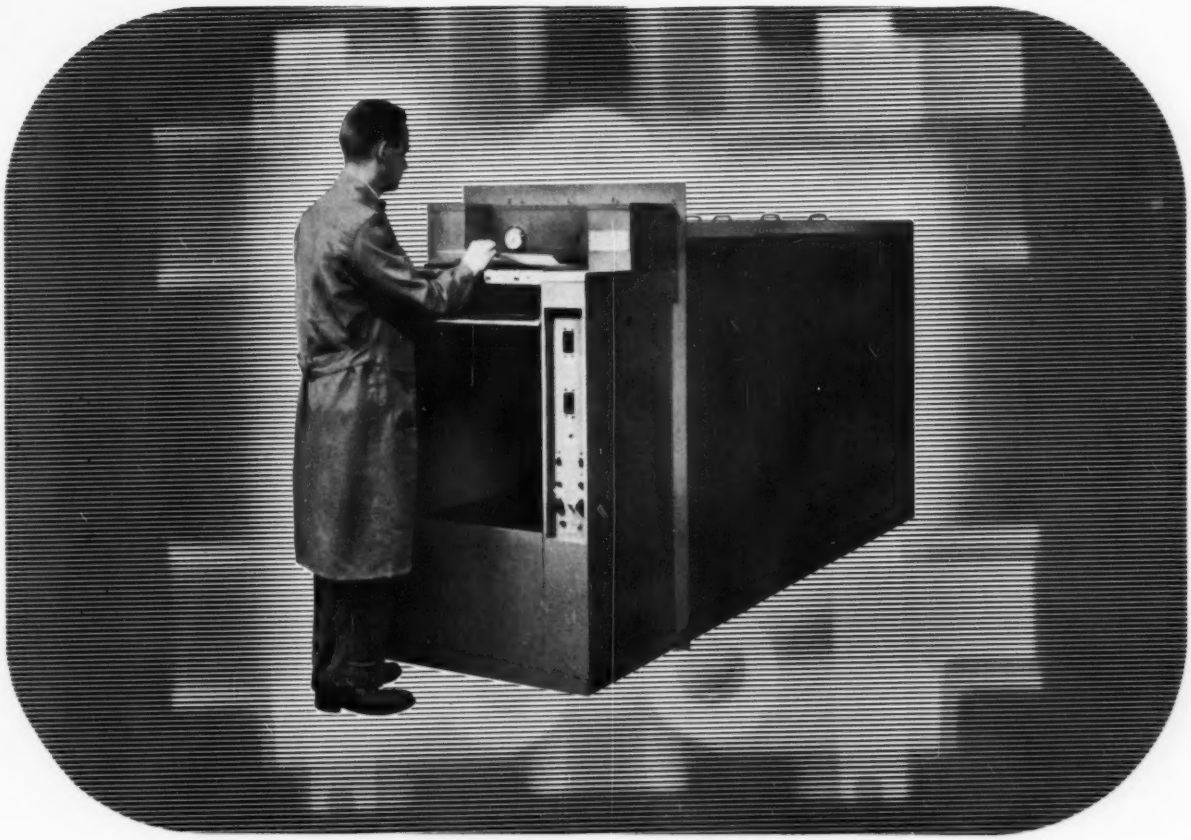
Electrolytic copper, del'd Conn. Valley	31.50
Copper, Lake	31.50
Straits Tin, New York	102.50
Zinc, E. St. Louis	11.00
Lead, St. Louis	11.005
Aluminum ingot	26.80

Note: Quotations are on going prices

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	24.70	24.00	8/1/58
Aluminum ingot	26.80	26.10	8/1/58
Copper (E)	31.50	30.00	3/9/59
Copper (CS)	32.00	32.50	4/30/59
Copper (L)	31.50	30.00	3/9/59
Lead, St. L.	11.80	11.30	5/7/59
Lead, N. Y.	12.00	11.50	5/7/59
Magnesium ingot	36.00	34.50	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	74.00	64.50	12/6/58
Titanium sponge	162-182	185-205	11/3/58
Zinc, E. St. L.	11.00	11.50	2/25/59
Zinc, N. Y.	11.50	12.00	2/25/59

ALUMINUM: 99% ingot frt allwd. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colbourne, Canada. ZINC: prime western. TIN: See above; Other primary prices, pg. 198.



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Kodak offers you automation in film processing—radiographs of uniform high quality, dry and ready to read in 13 minutes.

Film hangers are eliminated. Exposed films are merely removed from the film exposure holders and fed directly into the processor. Kodak Industrial X-ray Film, Type AA and Type M—sheet films or continuous lengths from 70mm to 17 inches wide—go through the system at 38 inches per minute. *And* only 22 inches of the unit's 10-foot 10-inch length need extend into the darkroom itself.

The Kodak X-Omat Processing System saves time and cuts costs. You'll want the complete story.

Send for the folder that gives all the details.

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MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship pt., frt. allowed)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.032	.081	.136 .249	.250- 3.
1100, 3003	45.7	43.8	42.8	43.3
5052	53.1	48.4	46.9	46.0
6061-0	50.1	45.7	43.9	44.9

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6- 8	42.7-44.2	51.1-54.6
12-14	42.7-44.2	52.0-56.5
24-26	43.2-44.7	62.8-67.5
36-38	46.7-49.2	86.9-90.5

Screw Machine Stock—2011-T-3

Size"	¼	⅜-⅝	¾-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate

Type→ Gage→	.250 3.00	.250- 2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	95.7	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	126	106	128
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	120	105	121
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	55.63	.....	52.86	55.82
Brass, Yellow	48.24	48.75	48.18	51.05
Brass, Low	51.23	51.77	51.17	54.54
Brass, R L	52.29	52.83	52.23	55.60
Brass, Naval	52.80	.....	46.61	56.21
Muntz Metal	50.85	.....	46.16	.....
Comm. Bz.	53.90	54.44	53.84	56.96
Mang. Bz.	56.54	.....	50.14	.....
Phos. Bz. 5%	75.34	.....	75.84	.....

Free Cutting Brass Rod 32.73

TITANIUM

(Base prices, f.o.b. mill)

Sheet and strip, commercially pure, $6.90-$7.40; alloy, $14.35, Plate, HR, commercially pure, $5.00-$5.75; alloy, $7.75-$8.50. Wire, rolled and/or drawn, commercially pure, $5.50-$6.00; alloy, $8.00-$9.50; Bar, HR or forged, commercially pure, $4.25-$4.65; alloy, $4.25-$7.15; billets, HR, commercially pure, $3.55-$4.10; alloy, $3.55-$5.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.30
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic basis... $ 1.31
Cobalt, 97-99% (per lb) ... $1.75 to $1.82
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 35.00 to 42.00
Gold, U. S. Treas., per troy oz. $35.00
Indium, 99.9%, dollars per troy oz.. $ 2.25
Iridium, dollars per troy oz. ... $75 to $85
Lithium, 98% ..... $11.00 to $14.00
Magnesium, sticks, 100 to 500 lb.... 59.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $245 to $249
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz... $18 to $20
Platinum, dollars per troy oz... $77 to $80
Rhodium ..... $120.00 to $125.00
Silver ingots (¢ per troy oz.) 91.375
Thorium, per kg. $43.00
Vanadium ..... $ 3.45
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 30.25
- No. 120 ..... 29.00
- No. 123 ..... 28.00

80-10-10 ingot
- No. 305 ..... 34.50
- No. 315 ..... 32.50

88-10-2 ingot
- No. 210 ..... 43.50
- No. 215 ..... 39.25
- No. 245 ..... 35.00

Yellow ingot
- No. 405 ..... 24.75

Manganese bronze
- No. 421 ..... 27.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 24.75-25.00
- 0.60 copper max. 24.50-24.75

Piston alloys (No. 122 type)..24.25-25.25
No. 12 alum. (No. 2 grade)...21.50-22.00
108 alloy 22.00-22.50
195 alloy 25.00-26.00
13 alloy (0.60 copper max.)...24.25-24.75
AXS-679 (1 pct zinc) 21.75-22.25

(Effective May 11, 1959)

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½% 22.50-23.50
Grade 2—92-95% 21.25-22.25
Grade 3—90-92% 20.25-21.25
Grade 4—85-90% 17.50-18.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	27½	26¾
Yellow brass	20⅝	18¾
Red brass	24¼	23½
Comm. bronze	25⅛	24⅜
Mang. bronze	19⅛	18⅝
Free cutting rod ends.	20½	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	27½
No. 2 copper wire	26
Light copper	24
*Refinery brass	25½
Copper bearing material	24¾

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	27½
No. 2 copper wire	26
Light copper	24
No. 1 composition	21
No. 1 comp. turnings	20½
Hvy. yellow brass solids	15½
Brass pipe	16
Radiators	16½

Aluminum

Mixed old cast.	12	—13
Mixed new clips	15	—16
Mixed turnings, dry	13	—14

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire	25	—25½
No. 2 copper wire	23	—23½
Light copper	21	—21½
Auto radiators (unsweated)	14½	—15
No. 1 composition	19	—19½
No. 1 composition turnings	17½	—18
Cocks and faucets	15	—15½
Clean heavy yellow brass	13½	—13¾
Brass pipe	15	—15½
New soft brass clippings	15¾	—16¼
No. 1 brass rod turnings	13	—13½

Aluminum

Alum. pistons and struts	6	— 6½
Aluminum crankcase	9½	—10
1100 (2s) aluminum clippings	13	—13½
Old sheet and utensils	9½	—10
Borings and turnings	6	— 6½
Industrial castings	9½	—10
2020 (24S) clippings	11	—11½

Zinc

New zinc clippings	4¾	— 5¼
Old zinc	3¼	— 3½
Zinc routings	2	— 2¼
Old die cast scrap	1¾	— 2

Nickel and Monel

Pure nickel clippings	52-54
Clean nickel turnings	37-40
Nickel anodes	52-54
Nickel rod ends	52-54
New Monel clippings	30-32
Clean Monel turnings	30-32
Old sheet Monel	26-28
Nickel Silver clippings, mixed	18
Nickel silver turnings, mixed	15

Lead

Soft scrap lead	7	— 7¼
Battery plates (dry)	2	— 2¼
Batteries, acid free	1⅞	— 2⅛

Miscellaneous

Block tin	77	—78
No. 1 pewter	59	—60
Auto babbitt	40	—41
Mixer common babbitt	9½	—10
Solder joints	13¼	—13¾
Siphon tops		42
Small foundry type	9½	—10
Monotype	9½	—10
Lino. and stereotype	8½	— 9
Electrotype	7	— 7½
Hand picked type shells	5¼	— 5¾
Lino. and stereo. dross	2¼	— 2¾
Electro dross	2¼	— 2¾

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3, R3*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Bridgeport, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3,* $114.00 *T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *F3*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

(Effective May 11, 1959)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*			7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A1*	6.275 *A1*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*	6.875 *G2*							$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *W5, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

* Electrogalvanized sheets.

(Effective May 11, 1959)

*7.425 at Sharon-Niles is 7.225

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7, A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3* 6.475 *T5*	9.025 *R3,R2* 8.775 *T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875*L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5* 9.225 *B5,P3, P8*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, S12*	8.625 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				8.675 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*				8.675 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.675 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective May 11, 1959) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING — **Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.**

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*7.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.00¢ per lb.

(Effective May 11, 1959)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium..					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, C4, A3, J2*) 10 pct	Plate (*L4, C4, A3, J2*) 15 pct	Plate (*L4, C4, A3, J2*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	40.80
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 43.15; 1 side, 36.20.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	10.10	.....	15.35
So. Chicago *R3*	.....	.....	.....	.....	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *P5*	.....	.....	.....	.....	.....	14.75
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	6.75	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

COKE

	Net-Ton
Furnace, beehive (f.o.b.) Connellsville, Pa.	$14.50 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Detroit f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearney, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	34.35
Erie, Pa., f.o.b.	32.00
Cleveland, del'd	34.19
Cincinnati, del'd	32.84
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1959 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30		
Grain Oriented			
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	Length (In.)	Price	CARBON* Diam. (In.)	Length (In.)	Price
24	84	27.25	40	100,110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky.	$185.00
High duty (except Salina, Pa., add $5.00)	140.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$158.00
Childs, Hays, Latrobe, Pa.	163.00
Chicago District	168.00
Western Utah	183.00
California	165.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	163.00-168.00
Silica cement, net ton, bulk, Latrobe	29.75
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$109.00
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Balt.	103.00

Magnesite Brick

Standard, Baltimore	$140.00
Chemically bonded, Baltimore	119.00

Grain Magnesite

St. ⅜ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$16.75
Missouri Valley	15.60
Midwest	17.00

(Effective May 11, 1959)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3***	173	190	...	...	190	9.00	9.675
Atlanta *A8***	175	192	...	214	198	8.75	9.425
Bartonville *K2***	175	192	178	214	198	9.10	9.775
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4***	177	190	172	212	196	9.00	9.70
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dav. *M4***	175	192	...	214	198	9.10	9.775
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	...	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	17.	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9*	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Monessen *P6*	.....	.....	.....	.....	193	8.65	9.325
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.60	10.15
Rankin, Pa. *A5*	173	187	...	...	193	9.00	9.55
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50†
SparrowsPt. *B3***	175	.....	.....	214	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 11-12¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *C4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	.....	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox	2	13	40.28	47.21	35.22
	2½	12	54.23	63.57	47.43
	3	12	62.62	73.40	54.77
	3½	11	73.11	85.70	63.93
	4	10	97.08	113.80	85.53
National Tube	2	13	40.28	47.21	35.22
	2½	12	54.23	63.57	47.43
	3	12	62.62	73.40	54.77
	3½	11	73.11	85.70	63.93
	4	10	97.08	113.80	85.53
Pittsburgh Steel	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

METAL POWDERS

Cents per lb, minimum truckload, delivered E. of Miss. River, unless otherwise noted.

Iron Powders

Compacting Powders

Electrolytic, imported, f.o.b.	29.50 to 33.00
Electrolytic, domestic	34.50
Sponge	11.25
Atomized	11.25
Hydrogen Reduced	11.25 to 12.00
Carbonyl	88.00
Welding Powders*	8.10
Cutting and Scarfing Powders*	9.10

Copper Powders

Electrolytic, domestic	41.00
Precipitated	40.50 to 45.00
Atomized	39.80 to 48.30
Hydrogen reduced, f.o.b.	43.25
Bronze	47.20 to 51.50
Chromium, electrolytic	$5.00
Lead	19.00
Manganese, f.o.b.	42.00
Molybdenum	$3.60 to $3.95
Nickel	$1.05 to $1.03
Nickel Silver	53.50
Nickel Steel	13.00
Solder	13¢ plus metal value
Stainless Steel, 302	$1.07
Stainless Steel, 316	$1.26
Steel, atomized, prealloyed, 4600 series	14.00 plus metal value
Tin	14¢ plus metal value
Titanium, 99.25+%, per lb., f.o.b.	$11.25
Tungsten	$3.15 (nominal)

* F.O.B., shipping point.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct. Discounts

Bolts	1–4 Containers	5 Containers	20,000 Lb.	40,000 Lb.
Machine				
½" and smaller x 3" and shorter	55	57	61	62
5/8" diam. x 3" and shorter	47	49½	54	55
¾" thru 1" diam x 6" and shorter	37	39½	45	46
¾" thru 1" diam. longer than 6" and 1⅛" and larger x all lengths	31	34	40	41
Rolled thread, ½" and smaller x 3" and shorter	55	57	61	62
Carriage, lag, plow, tap, blank, step, elevator and fitting up bolts ½" and smaller x 6" and shorter	48	50½	55	56

Note: Add 25 pct for less than container quantity. Distributor prices are 5 pct less on bolts and square nuts.

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

C. P. Hex, reg. & hvy.	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

Hot Galv. Hex Nuts (All Types)	
¾ in. and smaller	41

Semi-finished Hex Nuts	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

(Add 25 pct for broken case or keg quantities)

Finished	
⅞ in. and smaller	65

Rivets	*Base per 100 lb*
½ in. and larger	$12.85
	Pct. Off List
7/16 in. and smaller	15

Cap Screws	*Discount (Packages)*
	Full Finished H. C. Heat Treat
New std. hex head, packaged	Full Case
⅝" diam. and smaller x 6" and shorter	54
¾", ⅞", and 1" diam. x 6" and shorter	38
⅝" diam. and smaller x longer than 6"	..
¾", ⅞", and 1" diam. x longer than 6"	..

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	59	48
¾" through 1" dia. x 6" and shorter	45	32

Minimum quantity—¼" through ⅜" diam., 15,000 pieces; 7/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

Plain Finish	Discount Mach. Screws	Stove Bolts
Cartons	60	60
Bulk		
Quantity		
To ¼" diam. incl. 5/16 to ½" diam. incl. — 25,000-and over	60	..
15,000-200,000	60	..

Machine Screws & Stove Bolt Nuts

	Discount Hex	Square
In Cartons	16	19
Quantity		
In Bulk ⅜" diam. & smaller — 25,000-and over	15	16

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	44.50
Electrodeposited	37.50
Brass, 80-20, ball anodes, 2000 lb or more	47.50
Zinc, ball anodes, 2000 lb lots	18.00
(for elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carton, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium	1.45
Tin, ball anodes $1.05 per lb (approx.).	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	65.90
Copper sulphate, 100 lb bags, per cwt.	22.75
Nickel salts, single, 100 lb bags	36.00
Nickel chloride, freight allowed, 100 lb	45.00
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	23.70
(Philadelphia price 24.00)	
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	45.50
Chromic acid, flake type, 10,000 lb or more	30.44

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	140.9
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

STEEL SERVICE CENTERS

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.91	9.29	9.40	9.39	13.24*				
Baltimore	$.10	8.65	9.35	9.09	9.15	9.10	9.65	9.55	11.88*	16.28	15.28	19.82	19.08
Birmingham		8.18	9.45	10.46	8.51	8.89	9.00	8.99					
Boston	.10	10.22	10.50	12.07	11.27	10.42	10.79	10.34	13.45*	16.79	15.79	20.29	19.54
Buffalo	.15	8.55	9.75	11.00	8.90	9.35	9.40	9.30	11.60*	16.34	15.55	19.01	19.30
Chicago	.15	8.40	9.60	11.05	8.66	9.04	9.15	9.14	9.30	16.20	15.20	19.70	18.95
Cincinnati	.15	8.58	9.65	11.10	8.98	9.42	9.71	9.46	11.68*	16.52	15.52	20.02	19.27
Cleveland	.15	8.51	9.69	11.15	8.78	9.28	9.54	9.25	11.40*	16.31	15.31	19.81	19.06
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19				20.84
Detroit	.15	8.66	9.85	11.40	9.03	9.41	9.71	9.45	9.66	15.46	15.48	18.81	19.23
Houston		8.10	8.60		8.15	8.45	8.05	8.10	11.60	16.20	15.25	19.65	18.95
Kansas City	.15	9.02	10.27	11.37	9.33	9.71	9.82	9.81	10.22	16.87	15.87	20.37	19.62
Los Angeles		8.70[5]	11.20–11.80	12.20	9.15	9.10	9.00	9.10	12.95	17.30	16.35	21.30	20.60
Memphis	.15	8.55	9.80		8.60	8.93	9.01	8.97	12.11*				
Milwaukee	.15	8.54	9.73	11.19	8.80	9.18	9.37	9.28	9.54	16.34	15.34[7]	19.84	19.09
New York	.10	9.27	10.59	11.40	9.74	9.87	9.84	10.09	13.35*	16.16	15.60	20.10	19.35
Norfolk	.20	8.20			8.90	8.65	9.20	8.90	10.70				
Philadelphia	.10	8.30	9.35	10.71	9.35	9.25	9.20	9.50	12.05*	16.58	15.58	20.08	19.33
Pittsburgh	.15	8.91	9.47	10.95	10.36	9.05	9.15	9.14	11.40*	16.20	15.20	19.70	18.95
Portland		10.00[1]	11.75[2]	13.30[3]	11.95[4]	11.50[5]	11.10[6]	9.85[7]	15.30*	18.50	17.45	20.75	20.25
San Francisco	.10	9.75	11.20[9]	11.50	9.85	10.10	9.95	10.25	13.70	17.05	16.35	21.05	20.60
Seattle		10.30	11.55	12.50	10.25	10.10	10.20	10.50	14.70	17.15	16.80	20.65	20.60
Spokane	.15	10.45	11.70	12.65	10.65	10.25	10.35	11.15	14.85	17.75	16.95	21.55	20.75
St. Louis	.15	8.78	9.98	11.43	9.04	9.42	9.63	9.52	9.93	16.58	15.58	20.08	19.33
St. Paul	.15	8.94	10.19	11.64	8.99	9.45	9.53	9.70[7]	10.16		15.41		19.21

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **All sizes except 18 and 16 gage.

†† 10¢ zinc. ‡ Deduct for country delivery. * C1018—1 in. rounds. [1] 10 ga. x 36" x 120"; [2] 20 ga. x 36" x 120"; [3] 26 ga. x 30" x 96"; [4] 1¼" x 1" in lots of 1000 to 9999; [5] sheared plate ¼" x 84" in lots of 1000 to 9999; [6] 3" x 5.70" in lots of 1000 to 9999; [7] M-1020—1-in. rounds in lots of 1000 to 9999; [8] 15 ga. & heavier; [9] 14 ga. & lighter.

(Effective May 11, 1959)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	.....
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	.....
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	66.50	67.00	67.50	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	.....
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4* (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $103.50; (15.51-16.00), $106.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.); $64.00. Add $1.00 premium for all grades silvery to 18 pct.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25 31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Detroit. *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown. *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6;* Gary, *U1,* (25¢ per lb. higher).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *I4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11,* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8.*

(Effective May 11, 1959)

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Dimensions:

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Top Flange—96½" O.D., 83" I.D., 3" thick.

Body—83" I.D. with 1½" Wall.

Height—127½" F-F.

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KUTZTOWN, PENNSYLVANIA

FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	38.00
0.05% C....	39.00	1.00% C....	37.75
0.10% C....	38.50	1.50% C....	37.50
0.20% C....	38.25	2.00% C....	37.25

4.00-4.50% C, 60-70% Cr, 1-2% Si.. 38.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 38.25
0.025% C (Simplex) 36.75
8% max C, 50-55% Cr, 6% max Si. 25.75
4½% max C, 50-55% Cr, 2% max Si 26.50

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97.25% min. Cr, 1% max. Fe.

0.10% max. C	$1.29
9 to 11% C, 88-91% Cr, 0.75% Fe...	1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.15
Ton lots	1.17
Less ton lots	1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	28.25	14.60
Ton lots	33.50	16.05
Less ton lots	35.10	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads, bulk	24.00
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads, bulk	23.00
Ton lots	26.15
Less ton lots	27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	21.15
Less ton lots	22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	18.45
Ton lots	19.95
Less ton lots	21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	19.20
Ton lots to carload packed	21.15
Less ton lots	22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.25
Johnstown, Pa.	12.25
Neville Island, Pa.	12.25
Sheridan, Pa.	12.25
Philo, Ohio	12.25
S. Duquesne	12.25

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	14.80
Ton lots packed in bags	17.20

Spiegeleisen

Per gross ton, lump, f.o.b. Palmerton, Pa., and Neville Island, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$100.50
19 to 21%	3% max.	102.50
21 to 23%	3% max.	105.00

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	34.00
Ton lots	36.00
250 to 1999 lb	38.00
Premium for Hydrogen - removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 25.50

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% (Bulk) P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	33.60	36.40	37.60
0.30% max. C	32.10	34.90	36.10
0.50% max. C	31.60	34.40	35.60
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...	28.60	31.40	32.60

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carloads bulk	12.80
Ton lots, packed	14.45
Carloads, bulk, delivered, per lb of briquet	15.10
Briquets, packed pallets, 3000 lb up to carloads	16.30

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe..	24.95	23.65
98% Si, 1.0% Fe	24.45	23.15

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	8.00
Ton lots, packed	10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.60	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
	90% Si....	20.00	

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.

Openhearth	3.20
Crucible	3.30
High speed steel	3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots .....|	$2.05	$2.95	$3.75
100 to 1999 lb..	2.40	3.30	4.55

(Effective May 11, 1959)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads, bulk	9.85¢
Ton lots	11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.50

Ferrocolumbium, 50-60% lb, 2 in. x D, delivered per pound contained Cb.

Ton lots	$3.90
Less ton lots.....	3.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $240.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanni, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy

35-40% del'd. carloads, bulk..	26.25¢
12-15%, del'd lump, bulk-carloads	9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B

2000 lb carload	$5.50

Bortram, f.o.b. Niagara Falls.

Ton lots per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.

Ton lots per pound ..... 14.00¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots... $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19%	1.20
19% min. B	1.50

Grainal, f.o.b. Cambridge, O., freight allowed, 100 lb and over

No. 1	$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots (packed)	$1.48
Less ton lots (packed)	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

ANOTHER *PANNIER* MASTER MARKER!

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Many styles and sizes for metal marking. Letters, numbers or symbols on either or both ends; interchangeable type heads available.

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FISKE'S "MAGIC" COMPOUND, when dissolved in water, goes into a permanent emulsion—will never separate. It cools, lubricates and produces a high finish. Lengthens tool life. Does not become rancid. Try FISKE "MAGIC" COMPOUND and see the improvement in your work.

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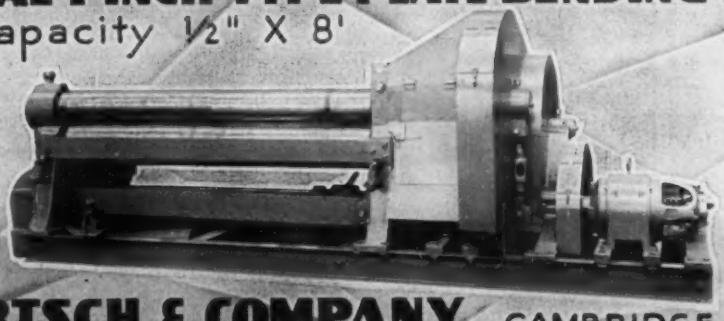

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Farwest Dealers Hunt Supplies in East

Used machinery sellers from the West Coast are scouring Eastern markets for late-model equipment.

On the wanted list are brakes, shears, millers, grinders, lathes and presses.

▪ Snappy business in used machinery has West Coast dealers scouring eastern markets. They're looking for a wide range of late-model, good-condition used equipment. Even some machines 10 years and older are selling.

Dealers in Los Angeles, San Francisco, and Seattle say the demand comes from a pickup in business. Military work is still a big factor. But growing production of consumer items is behind the stepped-up activity.

Items Wanted — In southern California, dealers need: 20-in. to 32-in. engine lathes; lathes with 6 ft swing and 52 in. centers; sheet metal equipment of all types; and small internal grinders. Even large grinders, long a drag on the market, are showing signs of life.

Used machinery business among northern California dealers ranges from good to excellent. The one big woe that is holding back volume: Shortage of good used equipment.

One dealer, who boasts a big backlog as his only problem "because we can't get the stuff to fill the orders," expects business to continue brisk for the balance of the year. In fact, he says, "It looks good for at least several years."

Also in Demand—A dealer who has a man searching for good equipment at the right price in Milwaukee, Chicago, and New York, says sheet metalworking tools lead the list of fast movers. We want "brakes, shears of all sizes. Also milling machines, turret lathes, and big boring mills—if we could only get them."

Drill presses and radial drills "under 20 years old" are in strong demand too.

Price Problems — Buying good used tools in the East is no easy job, another dealer confides. "The price has to be low enough to stand the freight costs, our profit, and still be within reason for the buyers."

Prices are holding fairly firm among most dealers in northern California, though one reported "some dickering though no weakness." Good used machinery will bring about 65 pct to 75 pct of a new equivalent. Price rises in new equipment have helped make used machinery more attractive.

Seattle Shortages — Seattle area used machinery dealers, facing an almost unprecedented demand in most lines, report rising prices and short supply of many types of used machinery.

Most needed are all types of light equipment: Machines suitable for electronics manufacture.

Heavier equipment, boring and milling machines, is moving at a rate faster than normal for Seattle, where little heavy machine work is done.

CONSIDER GOOD USED EQUIPMENT FIRST

BENDING ROLLS
10' x 10 Ga. Bertsch No. 6 Initial Type
14' x 1 3/16" Bertsch Initial Type—LATE
32' x ¾" BALDWIN PYRAMID TYPE—LATE
BRAKE—LEAF TYPE
12' x ⅛" Dreis & Krump
BRAKES—PRESS TYPE
90 ton Niagara. Model 90-8-10
10' x ⅛" Dreis & Krump
CRANES—OVERHEAD ELECTRIC TRAVELING

3 ton P&H	40' Span 220 Volt D.C.
5 ton P&H	57' Span 220/3/60 A.C.
8 ton P&H	55' Span 230/3/60
10 ton P&H	39' Span 230 Volt D.C.
10 ton Milwaukee	57' Span 230 Volt D.C.
10 ton Shaw	48' Span 230 Volt D.C.
10 ton Whiting	75' Span 220/3/60 A.C.
10 ton Shaw	120' Span 230 Volt D.C.
15 ton N-B-F	100' Span 220/3/60 A.C.
30 ton Shaw	70' Span 230 Volt D.C.
120 ton Niles	67' Span 230 Volt D.C.
120 ton Shepard Niles	77' Span 220/3/60 A.C.

DRAW BENCHES
7,000 lb. Draw Bench, 51 ft. Draw
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FORGING MACHINES
1" to 5" Acme, Ajax, National
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No. 35 U.S. Multi-Slide, Max. Capy. 4¼" wide x .089

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Pullmax Model 2, Capacity 11/32"
PRESSES—HYDRAULIC
500 ton Southwark, Platen 28" x 28", Stroke 25"
500 ton Watson Stillman Piercing Press, 48" x 72"
500 ton HPM Fastraverse, Bed 36" x 36"
600 ton Birdsboro, Platen 48 x 48", Stroke 15"
1000 ton Southwark, Bed 44" x 54", Stroke 20"
4500 ton B-L-H Bed 68 x 68", Stroke 40'
PRESSES—STRAIGHT SIDE
215 ton Clearing, Bed Area 36 x 42", Stroke 24"
900 ton Hamilton 4E-1809, Bed 101x181", Stroke 30"
PUNCH & SHEAR COMBINATIONS
#1½ Buffalo Universal Ironworker
#2½ Buffalo Ironworker
#8 Kling, 36" Throat Capacity 1¾" x 1"
Rock River Double End. 24" Throat. Capy. 1¼" x 1"
ROLLING MILLS
3½" x 7" Six Roll Cluster Mill
10" x 14" Single Stand Two High
13" x 16" Single Stand Two High
16" x 24" Two Stand Two High
20" x 36" Single Stand Two High
26" x 60" Single Stand Two High
10" Morgan Merchant Mill
12" x 32" Birdsboro 3-Hi Bar Mill
22" x 40" Lewis 3-Hi Sheet Mill
ROLLS—FORMING
6 Stand Dahlstrom #450-6 for stock to 4½ wide
18 Stand Custom Built, 2½ Shaft, will take 36" wide
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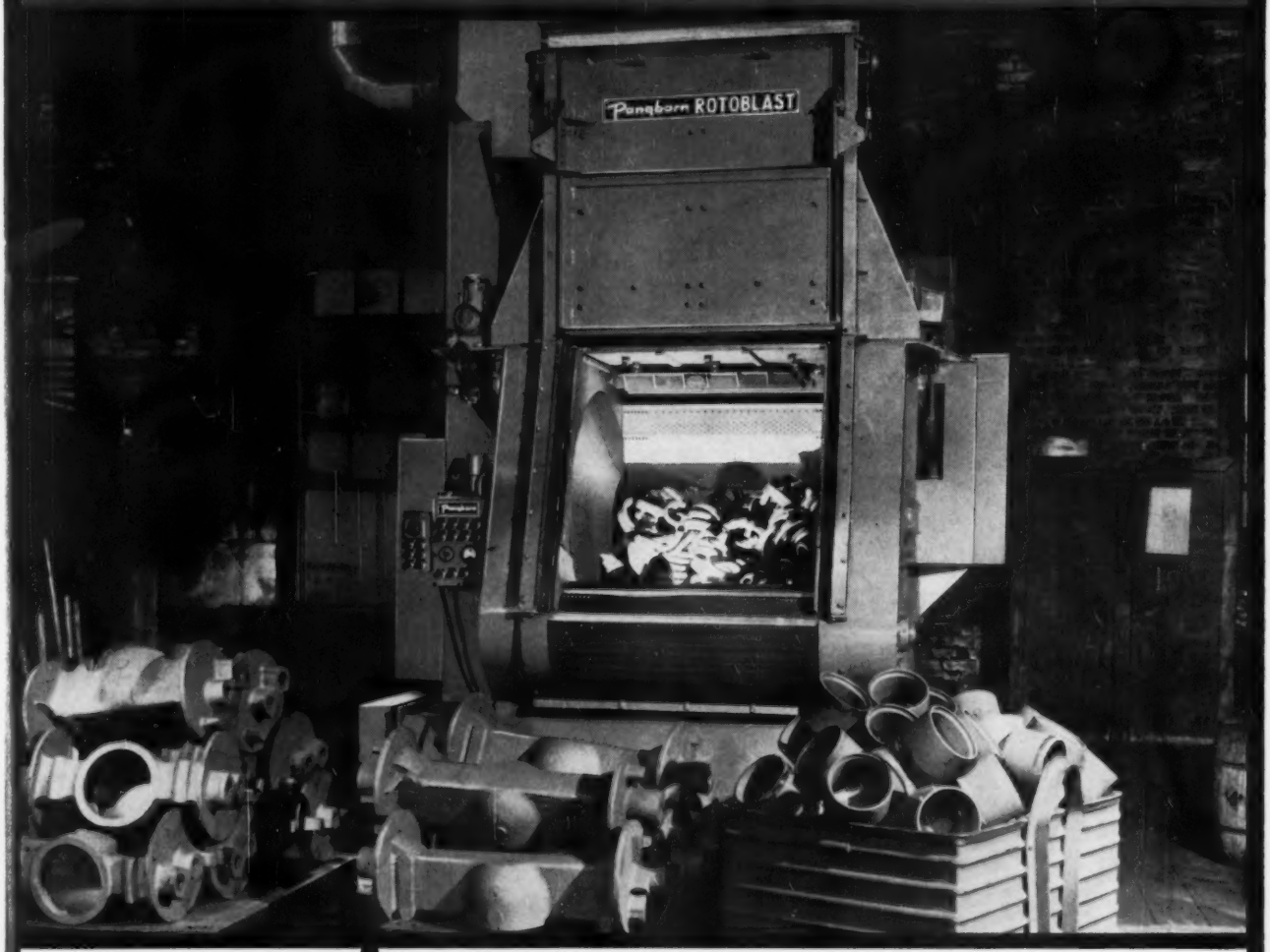

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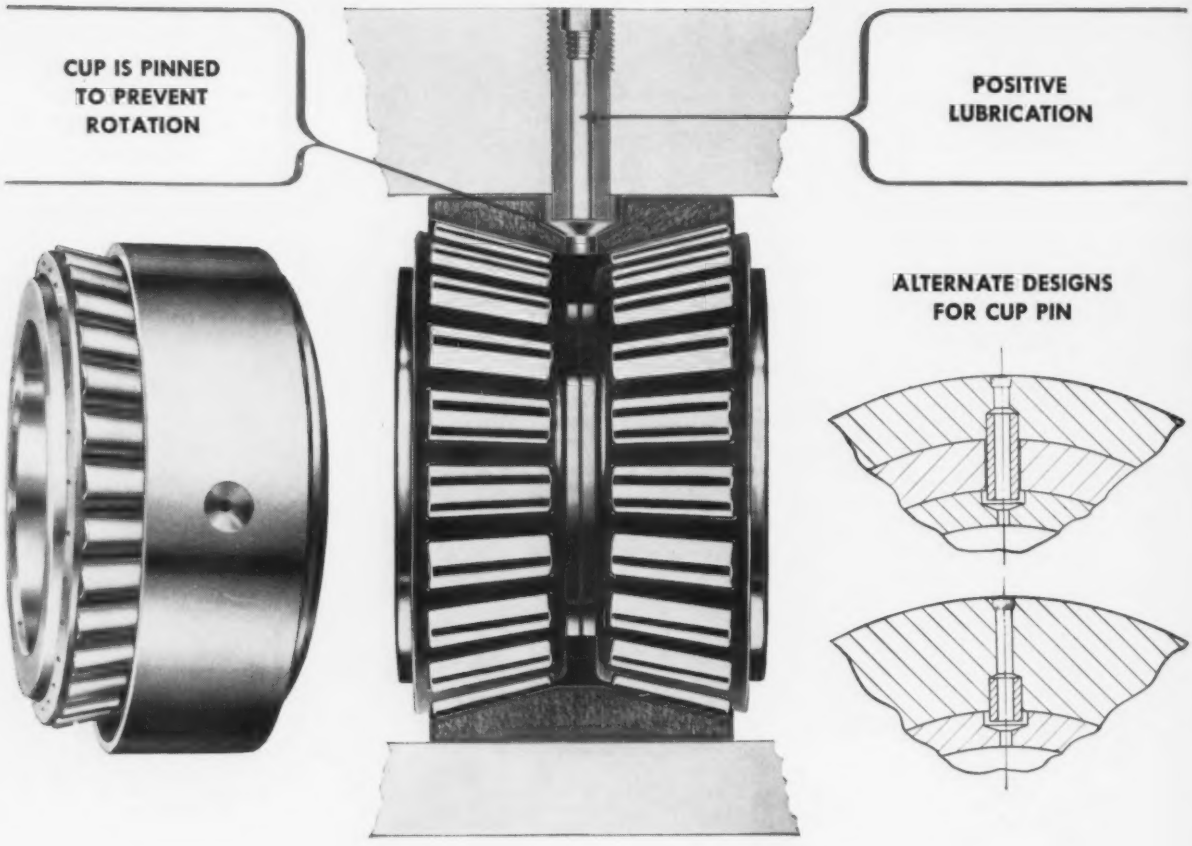

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